a1 WAL

1998,-- pending

a2

Page 20, line 30, insert, --FIGURE 52 illustrates a cut-away view of a bullet tipped with an explosive material formulated from hydrino hydride ions.--

a3

Page 55, line 22, replace "case, is a hydrino hydride tipped bullet" with --case as illustrated in Figure 52, is a bullet 700 tipped with hydrino hydride shown at 702,--.

IN THE CLAIMS:

Please amend claim 1 as follows:

a4

1. (Amended) A method for the explosive release of energy comprising reacting a deuterium or tritium hydrino hydride ion having a binding energy of about 0.65 eV, or a compound of said hydride ion, with a proton to produce a [molecular hydrogen] dihydrino molecule~~s~~ having a first binding energy of about 8,928 eV.

Please add new claims 3 - 280 as follows:

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--3. A method of making an explosion comprising:

reacting at least one hydrino hydride ion with protons to form dihydrino molecules and provide an explosive release of energy.

4. A method according to claim 3, wherein said reaction is initiated by energy from a percussion.

5. A method according to claim 4, wherein said percussion comprises colliding a projectile containing a source of said hydrino hydride ion and a source of said protons with an object with sufficient force to initiate said reaction.

121

6. A method according to claim 3, wherein said reaction is initiated by energy from detonation of an explosive material proximal to a source of said hydrino hydride ion and a source of said protons.

7. A method according to claim 3, wherein said reaction is initiated by heat energy.

8. A method according to claim 3, wherein said protons are supplied by a source of said protons comprising an acid.

9. A method according to claim 8, wherein said acid is a super-acid.

10. A method according to claim 8, wherein said acid is selected from the group consisting of HF, HCl, H_2SO_4, HNO_3, the reaction products of HF and SbF_5, the reaction products of HCl and Al_2Cl_6, the reaction products of H_2SO_3F and SbF_5, the reaction products of H_2SO_4 and SO_2, and combinations thereof.

11. A method according to claim 10, wherein said acid contains mainly H^1.

12. A method according to claim 10, wherein said acid contains mainly H^2.

13. A method according to claim 10, wherein said acid contains mainly H^3.

14. A method according to claim 10, wherein said reaction is initiated by a rapid mixing of said hydrino hydride ion with a source of said protons.

15. A method according to claim 14, wherein said source of protons comprises an acid.

16. A method according to claim 3, wherein said dihydrino molecules have a first

132

binding energy of about 8,928 eV.

17. A method according to claim 3, further comprising decomposing a source of said hydrino hydride ion to provide said at least one hydrino hydride ion, wherein said source of said hydrino hydride ion comprising at least one compound comprising said least one hydrino hydride ion and at least one other element.

18. A method according to claim 17, wherein said compound comprises at least one hydrino atom having a binding energy of about $13.6/n^2$ eV, wherein n is a fraction whose numerator is 1 and denominator is an integer greater than 1 and at least one other element.

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19. A method according to claim 17, wherein said compound comprises at least one dihydrino molecule having a first binding energy of about $15.5/n^2$ eV, wherein n is a fraction whose numerator is 1 and denominator is an integer greater than 1 and at least one other element.

20. A method according to claim 17, wherein said compound comprises at least one dihydrino molecular ion having a first binding energy of about $16.4/n^2$ eV, wherein n is a fraction whose numerator is 1 and denominator is an integer greater than 1, and at least one other element.

21. A method according to claim 17, wherein said compound comprises a hydrino hydride ion having a binding energy of about 0.65 eV and at least one other element.

22. A method according to claim 17, wherein the compound further comprises one or more selected from the group consisting of ordinary hydrogen molecules, ordinary hydride ions, ordinary hydrogen atoms, protons, ordinary hydrogen molecular ions,

123

and ordinary H^{3+}ions; and said method further comprises decomposing said compound to provide said hydrino hydride ion and protons.

23. A method according to claim 17, wherein the compound has a formula selected from the group of formulae consisting of MH, MH_2, and M_2H_2 wherein M is an alkali cation and H is selected from the group consisting of increased binding energy hydride ions, hydrino atoms and dihydrino molecules, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

24. A method according to claim 17, wherein the compound has the formula MH_n wherein n is 1 or 2, M is an alkaline earth cation and H is selected from the group consisting of hydrino hydride ions and hydrino atoms, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

25. A method according to claim 17, wherein the compound has the formula MHX wherein M is an alkali cation, X is one of a neutral atom, a molecule, or a singly negatively charged anion, and H is elected from the group consisting of hydrino hydride ions and hydrino atoms, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

26. A method according to claim 25, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

27. A method according to claim 17, wherein the compound has the formula MHX wherein M is an alkaline earth cation, X is a singly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

124

28. A method according to claim 27, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

29. A method according to claim 17, wherein the compound has the formula MHX wherein M is an alkaline earth cation, X is a doubly negatively charged anion, and H is a hydrino atom, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

30. A compound according to claim 29, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

31. A method according to claim 17, wherein the compound has the formula M_2HX wherein M is an alkali cation, X is a singly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

32. A method according to claim 31, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

33. A method according to claim 17, wherein the compound has the formula MH_n wherein n is an integer from 1 to 5, M is an alkali cation and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

125

34. A method according to claim 17, wherein the compound has the formula M_2H_n wherein n is an integer from 1 to 4, M is an alkaline earth cation and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

35. A method according to claim 17, wherein the compound has the formula M_2XH_n wherein n is an integer from 1 to 3, M is an alkaline earth cation, X is a singly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

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36. A method according to claim 35, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

37. A method according to claim 17, wherein the compound has the formula $M_2X_2H_n$ wherein n is 1 or 2, M is an alkaline earth cation, X is a singly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

38. A method according to claim 37, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

39. A method according to claim 17, wherein the compound has the formula M_2X_3H wherein M is an alkaline earth cation, X is a singly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms,

126

and said method further comprises decomposing said compound to provide said hydrino hydride ion.

40. A method according to claim 39, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

41. A method according to claim 17, wherein the compound has the formula M_2XH_n wherein n is 1 or 2, M is an alkaline earth cation, X is a doubly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

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42. A method according to claim 41, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

43. A method according to claim 17, wherein the compound has the formula $M_2XX'H$ wherein M is an alkaline earth cation, X is a singly negatively charged anion, X' is a doubly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

44. A method according to claim 43, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

45. A method according to claim 43, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

127

46. A method according to claim 17, wherein the compound has the formula $MM'H_n$ wherein n is and integer from 1 to 3, M is an alkaline earth cation, M' is an alkali metal cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

47. A method according to claim 17, wherein the compound is $MM'XH_n$ wherein n is 1 to 2, M is an alkaline earth cation, M' is an alkali metal cation, X is a singly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

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48. A method according to claim 47, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

49. A method according to claim 17, wherein the compound is MM'XH where M is an alkaline earth cation, M' is an alkali metal cation, X is a doubly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

50. A method according to claim 49, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

51. A method according to claim 17, wherein the compound has the formula MM'XX'H where M is an alkaline earth cation, M' is an alkali metal cation, X and X' are each a singly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms, and said method further comprises

128

decomposing said compound to provide said hydrino hydride ion.

52. A method according to claim 51, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

53. A method according to claim 17, wherein the compound has the formula H_nS wherein n is 1 or 2, and the hydrogen content of H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

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54. A method according to claim 17, wherein the compound has the formula $MSiH_n$ wherein n is an integer from 1 to 6, M is an alkali or alkaline earth cation, and the hydrogen content of H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

55. A method according to claim 17, wherein the compound has the formula $MXM'H_n$ wherein n is an integer from 1 to 5;

M is an alkali or alkaline earth cation;

X is a singly negatively charged anion or a doubly negatively charged anion;

M' is selected from the group consisting of Si, Al, Ni, the transition elements, the inner transition elements, and the rare earth elements; and

the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

56. A method according to claim 55, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen

129

carbonate ions, and nitrate ions.

57. A method according to claim 55, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

58. A method according to claim 17, wherein the compound has the formula $MAlH_n$ wherein n is an integer from 1 to 6, M is an alkali or alkaline earth cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

25

59. A method according to claim 17, wherein the compound has the formula MH_n wherein:

n is an integer from 1 to 6;

M is selected from the group consisting of the transition elements, the inner transition elements, and the rare earth element cations and nickel; and

the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

60. A method according to claim 17, wherein the compound has the formula $MNiH_n$ wherein:

n is an integer from 1 to 6;

M is selected from the group consisting of alkali cations, alkaline earth cations, silicon, and aluminum; and

the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

130

61. A method according to claim 17, wherein the compound has the formula $MM'H_n$ wherein:

n is an integer from 1 to 6;

M is selected from the group consisting of alkali cations, alkaline earth cations, silicon, and aluminum;

M' is selected from the group consisting of the transition elements, the inner transition elements, and rare earth element cations; and

the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

05

62. A method according to claim 17, wherein the compound has the formula M_2SiH_n wherein n is an integer from 1 to 8, M is an alkali or alkaline earth cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

63. A method according to claim 17, wherein the compound has the formula Si_2H_n wherein n is an integer from 1 to 8, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

64. A method according to claim 17, wherein the compound has the formula SiH_n wherein n is an integer from 1 to 8, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

65. A method according to claim 17, wherein the compound has the formula TiH_n wherein n is an integer from 1 to 4, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises

131

decomposing said compound to provide said hydrino hydride ion.

66. A method according to claim 17, wherein the compound has the formula Al_2H_n wherein n is an integer from 1 to 4 and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

67. A method according to claim 17, wherein the compound has the formula $MXAlX'H_n$ wherein n is 1 or 2, M is an alkali or alkaline earth cation, X and X' are each either a singly negatively charged anion or a doubly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

68. A method according to claim 67, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

69. A method according to claim 67, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

70. A method according to claim 17, wherein the compound has the formula $MXSiX'H_n$ wherein n is 1 or 2, M is an alkali or alkaline earth cation, X and X' are each either a singly negatively charged anion or a doubly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

71. A method according to claim 70, wherein said singly negatively charged anion is

132

selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

72. A method according to claim 70, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

73. A method according to claim 17, wherein the compound has the formula SiO_2H_n wherein n is an integer from 1 to 6 and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

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74. A method according to claim 17, wherein the compound has the formula $MSiO_2H_n$ wherein n is an integer from 1 to 6, M is an alkali or alkaline earth cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

75. A method according to claim 17, wherein the compound has the formula MSi_2H_n wherein n is an integer from 1 to 6, M is an alkali or alkaline earth cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

76. A method according to claim 17, wherein the compound has the formula M_2SiH_n wherein n is an integer from 1 to 8, M is an alkali or alkaline earth cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species, and said method further comprises decomposing said compound to provide said hydrino hydride ion.

133

77. A method according to claim 17, wherein the compound is greater that 50 atomic percent pure.

78. A method according to claim 17, wherein the compound is greater that 90 atomic percent pure.

79. A method according to claim 17, wherein said at least one other element comprises at least one selected from the group consisting of a proton, ordinary hydrogen ion, ordinary hydrogen atom, ordinary hydrogen molecules, ordinary hydrogen molecular ions and ordinary H_3^+ ions and said method further comprises decomposing said compound to provide said hydrino hydride ion.

a5

80. A method according to claim 17, wherein said at least one other element comprises at least one element selected from the group consisting of alkaline earth metals and alkali metals and said method further comprises decomposing said compound to provide said hydrino hydride ion.

81. A method according to claim 80, wherein said element comprises lithium or lithium ion.

82. A method according to claim 17, wherein said at least one other element comprises at least one element selected from the group consisting of organic compounds and said method further comprises decomposing said compound to provide said hydrino hydride ion.

83. A method according to claim 17, wherein said at least one other element comprises at least one element selected from the group consisting of semiconductors and said method further comprises decomposing said compound to provide said hydrino hydride ion.

134

84. A method according to claim 17, wherein said compound comprising:

(a) at least one neutral, positive or negative increased binding energy hydrogen species having a binding energy:

(i) greater than the binding energy of the corresponding ordinary hydrogen species, or

(ii) greater than the binding energy of any hydrogen species for which the corresponding ordinary hydrogen species is unstable or is not observed because the ordinary hydrogen species' binding energy is less than thermal energies at ambient conditions, or is negative; and

(b) at least one other element, wherein said increased binding energy hydrogen species is selected from the group consisting of H_n, H_n^-, and H_n^+, where n is an integer of 1 to 8, and n is greater than 1 when H has a positive charge.

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85. A method according to claim 84, wherein said increased binding energy hydrogen species is selected from the group consisting of (a) a hydride ion having a binding energy greater than the binding energy of the corresponding ordinary hydride ion for p = 2 up to 23 in which the binding energy is represented by

$$Binding\ Energy = \frac{\hbar^2\sqrt{s(s+1)}}{8\mu_e a_0^2\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^2} - \frac{\pi\mu_0 e^2\hbar^2}{m_e^2 a_0^3}\left(1+\frac{2^2}{\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^3}\right)$$

+T,1350

where p is an integer greater than 1, s = ½, ħ is Plank's constant bar, μ_0 is the permeability of vacuum, m_e is the mass of the electron, μ_e is the reduced electron mass, a_0 is the Bohr radius, and e is the elementary charge; (b) hydrogen atom having a binding energy greater than about 13.6 eV; (c) hydrogen molecule having

135

a first binding energy greater than about 15.5 eV; and (d) molecular hydrogen ion having a binding energy greater than about 16.4 eV.

86. A method according to claim 84, wherein the increased binding energy hydrogen species comprises hydride ion having a binding energy of about 3.0, 6.6, 11.2, 16.7, 22.8 29.3, 36.1, 42.8, 49.4, 55.5, 61.0, 65.6, 69.2, 71.53, 72.4, 71.54, 68.8, 64.0, 56.8, 47.1, 34.6, of 19.2.

87. A method according to claim 84, wherein said increased binding energy hydrogen species is a hydride ion having a binding energy greater than the binding energy of the corresponding ordinary hydride ion for p = 2 up to 23 in which the binding energy is represented by

Q5

$$Binding\ Energy = \frac{\hbar^2\sqrt{s(s+1)}}{8\mu_e a_0^2\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^2} - \frac{\pi\mu_0 e^2\hbar^2}{m_e^2 a_0^3}\left(1+\frac{2^2}{\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^3}\right)$$

+T, 1360

where p is an integer greater than 1, s = ½, ℏ is Plank's constant bar, μ_0 is the permeability of vacuum, m_e is the mass of the electron, μ_e is the reduced electron mass, a_0 is the Bohr radius, and e is the elementary charge.

88. A method according to claim 84, wherein said increased binding energy hydrogen species is selected from the group consisting of (a) a hydrino atom having a binding energy of about 13.6 eV/(1/p)^2, where p is an integer greater than 1; (b) a hydride ion having a binding energy represented by

1360

$$Binding\ Energy = \frac{\hbar^2\sqrt{s(s+1)}}{8\mu_e a_0^2\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^2} - \frac{\pi\mu_0 e^2\hbar^2}{m_e^2 a_0^3}\left(1+\frac{2^2}{\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^3}\right)$$

+T, 1370

where p is an integer greater than 1, s = ½, ħ is Plank's constant bar, μ_0 is the permeability of vacuum, m_e is the mass of the electron, μ_e is the reduced electron mass, a_0 is the Bohr radius, and e is the elementary charge; (c) a trihydrino molecular ion, H_3^+ (1/p), having a binding energy of about $22.6/(1/p)^2$ eV; (d) a dihydrino molecule having a binding energy of about $15.5/(1/p)^2$ eV; and (e) a dihydrino molecular ion with a binding energy of about $16.4/(1/p)^2$ eV.

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89. A method according to claim 88, wherein p is 2 to 200.

90. A method according to claim 88, wherein p is 2 to 24.

91. A method according to claim 88, wherein said increased binding energy hydrogen species is negative.

92. A method according to claim 3, wherein said at least one hydrino hydride ion comprises a mixture of 2 or more types of hydrino hydride ions.

93. A method according to claim 3, further comprising reacting hydrino atoms with electrons to produce said hydrino hydride ion.

94. A method according to claim 93, further comprising forming said hydrino atoms from hydrogen atoms by use of a catalyst having a net enthalpy of reaction of at least m27 eV, where m is an integer.

137

95. A method according to claim 93, further comprising forming said hydrino atoms from hydrogen atoms by use of a catalyst adapted to provide a resonant absorption with the energy released by said hydrogen atoms when said hydrogen atoms undergo a transition to a lower energy state.

96. A method according to claim 93, further comprising forming said hydrino atoms from hydrogen atoms by use of a catalyst comprising a salt of rubidium.

97. A method according to claim 96, wherein said salt of rubidium is selected from the group consisting of RbOH, Rb_2SO_4, Rb_2CO_3, and Rb_3PO_4.

Q5

98. A method according to claim 93, further comprising forming said hydrino atoms from hydrogen atoms by use of a catalyst comprising a salt of potassium.

99. A method according to claim 98, wherein said salt of potassium is selected from the group consisting of KOH, K_2SO_4, K_2CO_3 and K_3PO_4.

100. A method according to claim 98, wherein said salt of potassium is K_2CO_3.

101. A method according to claim 93, further comprising forming hydrino atoms from hydrogen atoms by use of a catalyst comprising a salt of titanium.

102. A method according to claim 93, further comprising forming said hydrino atoms from hydrogen atoms by use of a catalyst comprising an ion selected from the group consisting of (Rb^+), (Mo^{2+}), and (Ti^{2+}).

103. A method according to claim 93, further comprising forming said hydrino atoms from hydrogen atoms by use of a catalyst selected from the group consisting of (Al^{2+}), (Ar^+), (Ti^{2+}), (As^{2+}), (Rb^+), (Mo^{2+}), (Ru^{2+}), (In^{2+}), and (Te^{2+}).

138

104. A method according to claim 93, further comprising forming said hydrino atoms from hydrogen atoms by use of a catalyst capable of providing a net enthalpy of reaction in the range of 26.8 to 28.5 eV.

105. A method according to claim 93, further comprising forming said hydrino atoms from hydrogen atoms by use of a catalyst comprising at least one pair of ions selected from the group consisting of: (Sn^{4+}, Si^{4+}), (Pr^{3+}, Ca^{2+}), (Sr^{2+}, Cr^{2+}), (Cr^{3+}, Tb^{3+}), (Sb^{3+},Co^{2+}), (Bi^{3+}, Ni^{2+}), (Pd^{2+}, In^{+}), (La^{3+}, Dy^{3+}), (La^{3+}, Ho^{3+}), (K^{+}, K^{+}) , (V^{3+}, Pd^{2+}), (Lu^{3+}, Zn^{2+}), (As^{3+}, Ho^{3+}), (Mo^{5+}, Sn^{4+}), (Sb^{3+}, Cd^{2+}), (Ag^{2+},Ag^{+}), (La^{3+}, Er^{3+}), (V^{4+}, B^{3+}), (Fe^{3+}, Ti^{3+}), (Co^{2+}, Ti^{+}), (Bi^{3+}, Zn^{2+}), (As^{3+}, Dy^{3+}), (Ho^{3+}, Mg^{2+}), (K^{+}, Rb^{+}), (Cr^{3+}, Pr^{3+}), (Sr^{2+}, Fe^{2+}), (Ni^{2+}, Cu^{+}), (Li^{+}, Pb^{2+}), (Sr^{2+}, Mo^{2+}), (Y^{3+}, Zr^{4+}), (Cd^{2+}, Ba^{2+}), (Ho^{3+}, Pb^{2+}), (Eu^{3+}, Mg^{2+}), (Er^{3+}, Mg^{2+}), (Bi^{4+}, Al^{3+}), (Ca^{2+}, Sm^{3+}), (V^{3+}, La^{3+}), (Gd^{3+}, Cr^{2+}), (Mn^{2+}, Ti^{+}), (Yb^{3+}, Fe^{2+}), (Ni^{2+}, Ag^{+}), (Zn^{2+}, Yb^{2+}), (Se^{4+}, Sn^{4+}), (Sb^{3+}, Bi^{2+}), and (Eu^{3+}, Pb^{2+}).

95

106. A method according to claim 93, further comprising forming said hydrino atoms from hydrogen atoms by use of a catalyst comprising oxygen in combination with at least one atom selected from the group consisting of Cu, As, Pd, Te, Cs and Pt.

107. A method according to claim 93, further comprising forming said hydrino atoms from hydrogen atoms by use of a catalyst comprising at least one pair selected from the group consisting of: (B, Li^{+}), (S, Li^{+}), (Br, Li^{+}), (Pm^{+}, Li^{+}), (Sm^{+}, Li^{+}), (Tb^{+}, Li^{+}), (Dy^{+}, Li^{+}), (Sb^{+}, H^{+}) and (Bi^{+}, H^{+}).

108. A method according to claim 93,further comprising forming said hydrino atoms from hydrogen atoms by use of a catalyst comprising at least one pair selected from the group consisting of:

(He 0+ , Co 3+);	(O 1+ , Nd 4+);	(Al 2+ , Cl 5+);
(He 0+ , Ga 3+);	(O 1+ , Tb 4+);	(Al 4+ , Mn 8+);
(Li 0+ , Ni 3+);	(O 2+ , Ne 3+);	(Si 1+ , Mg 2+);

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139

(Li 0+ , Xe 3+);
(Li 0+ , Hg 3+);
(Li 1+ , Na 4+);
(Li 1+ , Y 6+);
(Be 1+ , Bi 6+);
(Be 2+ , Al 6+);
(B 1+ , C 2+);
(B 1+ , K 2+);
(B 1+ , Ho 3+);
(B 1+ , Er 3+);
(B 1+ , Tm 3+);
(B 1+ , Lu 3+);
(C 1+ , N 2+);
(C 1+ , V 3+);
(C 1+ , Tc 3+);
(C 1+ , Ru 3+);
(C 1+ , Sn 3+);
(C 2+ , Mn 4+);
(C 2+ , Co 4+);
(N 0+ , Sr 2+);
(N 0+ , La 2+);
(N 0+ , Ce 2+);
(N 0+ , Pr 2+);
(N 0+ , Nd 2+);
(N 0+ , Pm 2+);
(N 0+ , Sm 2+);
(N 0+ , Eu 2+);
(N 1+ , O 2+);
(N 1+ , Si 3+);
(N 1+ , P 3+);
(N 1+ , Mn 3+);
(N 1+ , Rh 3+);
(N 2+ , F 3+);
(N 3+ , Br 6+);
(O 0+ , Ti 2+);
(O 0+ , V 2+);
(O 0+ , Nb 2+);
(O 0+ , Hf 2+);
(O 1+ , Ne 2+);
(O 1+ , Ca 3+);
(Cl 2+ , Ho 4+);
(Cl 2+ , Er 4+);
(Cl 3+ , Cl 4+);
(Cl 5+ , Ni 6+);
(Cl 5+ , Cu 6+);
(Cl 5+ , Rb 7+);
(Ar 0+ , Ba 2+);
(Ar 0+ , Ce 2+);
(Ar 0+ , Pr 2+);
(Ar 0+ , Nd 2+);
(O 3+ , Sb 6+);
(O 4+ , Fe 7+);
(F 0+ , Al 2+);
(F 0+ , Si 2+);
(F 0+ , Fe 2+);
(F 0+ , Co 2+);
(F 0+ , Ru 2+);
(F 0+ , In 2+);
(F 0+ , Sb 2+);
(F 0+ , Bi 2+);
(F 1+ , Sb 4+);
(F 3+ , Fe 6+);
(Ne 0+ , Sm 3+);
(Ne 0+ , Dy 3+);
(Ne 0+ , Ho 3+);
(Ne 0+ , Er 3+);
(Ne 0+ , Lu 3+);
(Ne 1+ , N 3+);
(Ne 1+ , K 3+);
(Ne 1+ , V 4+);
(Ne 2+ , O 4+);
(Na 0+ , Al 2+);
(Na 0+ , Si 2+);
(Na 0+ , Fe 2+);
(Na 0+ , Co 2+);
(Na 0+ , Ru 2+);
(Na 0+ , In 2+);
(Na 0+ , Sb 2+);
(Na 0+ , Bi 2+);
(Na 2+ , Ti 5+);
(Na 2+ , Kr 6+);
(Na 3+ , Y 7+);
(Mg 1+ , Rb 3+);
(Mg 1+ , Eu 4+);
(Mg 3+ , Ne 5+);
(Mg 6+ , Cl 8+);
(Al 1+ , Sc 2+);
(Al 1+ , Zr 2+);
(Al 1+ , Lu 2+);
(Al 2+ , S 5+);
(Sc 4+ , N 5+);
(Ti 2+ , Ar 2+);
(Ti 2+ , Mo 3+);
(Ti 4+ , O 5+);
(Ti 4+ , Zn 6+);
(Ti 4+ , As 6+);
(V 1+ , Sr 2+);
(V 1+ , La 2+);
(V 1+ , Ce 2+);
(V 1+ , Pr 2+);
(Si 1+ , V 2+);
(Si 1+ , Tc 2+);
(Si 1+ , Sn 2+);
(Si 1+ , Hf 2+);
(Si 1+ , Pb 2+);
(Si 2+ , Co 3+);
(Si 2+ , Ga 3+);
(Si 2+ , Ge 3+);
(Si 2+ , Tl 3+);
(Si 3+ , Ni 6+);
(Si 3+ , Rb 7+);
(Si 4+ , Al 6+);
(P 1+ , Mg 2+);
(P 1+ , Tc 2+);
(P 1+ , Sn 2+);
(P 1+ , Hf 2+);
(P 1+ , Pb 2+);
(P 2+ , Ni 3+);
(P 2+ , Cd 3+);
(P 2+ , Xe 3+);
(P 3+ , Nb 5+);
(P 5+ , C 5+);
(S 1+ , P 2+);
(S 1+ , Se 2+);
(S 1+ , La 3+);
(S 1+ , Ce 3+);
(S 1+ , Au 2+);
(S 2+ , Sr 3+);
(S 2+ , Cd 3+);
(S 3+ , Cu 4+);
(S 3+ , Rb 4+);
(S 4+ , O 4+);
(Cl 1+ , C 2+);
(Cl 1+ , K 2+);
(Cl 1+ , Zr 3+);
(Cl 1+ , Eu 3+);
(Cl 1+ , Tm 3+);
(Cl 2+ , Te 4+);
(Cl 2+ , Sm 4+);
(Cl 2+ , Gd 4+);
(Mn 4+ , Ge 5+);
(Fe 1+ , Sc 2+);
(Fe 1+ , Y 2+);
(Fe 1+ , Yb 2+);
(Fe 1+ , Lu 2+);
(Fe 2+ , S 3+);
(Fe 2+ , Cu 3+);
(Fe 2+ , Zn 3+);
(Fe 2+ , Br 3+);
(Fe 2+ , Zr 4+);

a5

140

a5

(Ar 0+ , Ra 2+);
(Ar 1+ , Ti 3+);
(Ar 2+ , C 3+);
(Ar 3+ , K 4+);
(Ar 3+ , Br 5+);
(Ar 3+ , Mo 5+);
(Ar 4+ , Y 5+);
(K 1+ , Si 3+);
(K 1+ , P 3+);
(K 1+ , Mn 3+);
(K 1+ , Ge 3+);
(K 1+ , Rh 3+);
(K 1+ , Tl 3+);
(K 2+ , He 2+);
(K 2+ , Si 4+);
(K 2+ , As 4+);
(K 3+ , P 5+);
(K 3+ , Zr 5+);
(K 4+ , Rb 6+);
(K 5+ , Mg 4+);
(K 5+ , Kr 7+);
(K 6+ , Y 8+);
(Ca 1+ , C 2+);
(Ca 1+ , Sm 3+);
(Ca 1+ , Dy 3+);
(Ca 1+ , Ho 3+);
(Ca 1+ , Er 3+);
(Ca 1+ , Tm 3+);
(Ca 1+ , Lu 3+);
(Ca 2+ , O 3+);
(Ca 2+ , Ni 4+);
(Ca 3+ , Mn 5+);
(Ca 3+ , Rb 5+);
(Ca 4+ , Cl 6+);
(Ca 4+ , Ar 6+);
(Ca 4+ , Sc 5+);
(Ca 5+ , Y 7+);
(Sc 2+ , Ti 4+);
(Sc 2+ , Bi 4+);
(Cu 4+ , Rb 6+);
(Cu 5+ , Mn 7+);
(Zn 1+ , P 2+);
(Zn 1+ , I 2+);
(Zn 1+ , La 3+);
(Zn 1+ , Au 2+);
(Zn 1+ , Hg 2+);
(Zn 2+ , Ti 4+);
(Zn 2+ , Sn 4+);
(Zn 2+ , Bi 4+);
(Zn 3+ , As 5+);
(V 1+ , Nd 2+);
(V 1+ , Pm 2+);
(V 1+ , Sm 2+);
(V 1+ , Eu 2+);
(V 2+ , O 2+);
(V 3+ , Mn 4+);
(V 3+ , Co 4+);
(V 4+ , Ar 6+);
(V 4+ , Sc 5+);
(V 5+ , Mg 5+);
(V 6+ , Sc 8+);
(V 6+ , Br 8+);
(Cr 1+ , Sc 2+);
(Cr 1+ , Ti 2+);
(Cr 1+ , Zr 2+);
(Cr 1+ , Lu 2+);
(Cr 2+ , F 2+);
(Cr 2+ , Na 2+);
(Cr 2+ , Se 3+);
(Cr 2+ , Pd 3+);
(Cr 2+ , I 3+);
(Cr 2+ , Hg 3+);
(Cr 3+ , O 3+);
(Cr 3+ , Ni 4+);
(Cr 4+ , O 4+);
(Cr 5+ , Ne 5+);
(Cr 5+ , Fe 7+);
(Mn 1+ , V 2+);
(Mn 1+ , Nb 2+);
(Mn 1+ , Sn 2+);
(Mn 1+ , Hf 2+);
(Mn 2+ , Cu 3+);
(Mn 2+ , Zn 3+);
(Mn 2+ , Br 3+);
(Mn 2+ , Zr 4+);
(Mn 2+ , Ce 4+);
(Mn 2+ , Hf 4+);
(Mn 3+ , Mg 3+);
(Mn 3+ , Te 5+);
(Se 1+ , Fe 2+);
(Se 1+ , Co 2+);
(Se 1+ , Ge 2+);
(Se 1+ , Ru 2+);
(Se 1+ , In 2+);
(Se 1+ , Bi 2+);
(Se 2+ , Te 3+);
(Se 3+ , Br 4+);
(Se 5+ , Y 7+);
(Br 1+ , P 2+);
(Br 1+ , I 2+);
(Fe 2+ , Ce 4+);
(Fe 5+ , Sr 7+);
(Co 1+ , Mg 2+);
(Co 1+ , Cr 2+);
(Co 1+ , Mn 2+);
(Co 1+ , Mo 2+);
(Co 1+ , Tc 2+);
(Co 1+ , Pb 2+);
(Co 2+ , Cu 3+);
(Co 2+ , Zn 3+);
(Co 2+ , Br 3+);
(Co 2+ , Zr 4+);
(Co 2+ , Ag 3+);
(Co 2+ , Ce 4+);
(Co 2+ , Hf 4+);
(Co 4+ , Nb 6+);
(Co 5+ , Sc 6+);
(Ni 1+ , Co 2+);
(Ni 1+ , Ni 2+);
(Ni 1+ , Rh 2+);
(Ni 1+ , Cd 2+);
(Ni 1+ , Sb 2+);
(Ni 2+ , Ne 2+);
(Ni 2+ , Ca 3+);
(Ni 2+ , Nd 4+);
(Ni 2+ , Tb 4+);
(Ni 4+ , Rb 6+);
(Ni 6+ , Ar 8+);
(Cu 1+ , Ag 2+);
(Cu 1+ , I 2+);
(Cu 1+ , Cs 2+);
(Cu 1+ , Au 2+);
(Cu 1+ , Hg 2+);
(Cu 2+ , Sm 4+);
(Cu 2+ , Gd 4+);
(Cu 2+ , Dy 4+);
(Cu 3+ , K 4+);
(Cu 3+ , Br 5+);
(Cu 3+ , Mo 5+);
(Sr 1+ , Ga 2+);
(Sr 1+ , Te 2+);
(Sr 1+ , Pt 2+);
(Sr 1+ , Tl 2+);
(Sr 2+ , C 3+);
(Sr 2+ , Mo 4+);
(Sr 3+ , Ar 4+);
(Sr 3+ , Sr 4+);
(Sr 3+ , Sb 5+);
(Sr 3+ , Bi 5+);
(Sr 4+ , Ar 5+);

141

G5

(Zn 4+ , Sr 6+);
(Zn 5+ , Mn 7+);
(Zn 6+ , Mo 8+);
(Ga 1+ , Cr 2+);
(Ga 1+ , Mn 2+);
(Ga 1+ , Fe 2+);
(Ga 1+ , Ge 2+);
(Ga 1+ , Mo 2+);
(Ga 1+ , Ru 2+);
(Ga 1+ , Bi 2+);
(Ga 2+ , Rb 3+);
(Ga 2+ , Eu 4+);
(Ga 2+ , Tm 4+);
(Ge 1+ , Mg 2+);
(Ge 1+ , Mn 2+);
(Ge 1+ , Tc 2+);
(Ge 1+ , Sn 2+);
(Ge 1+ , Pb 2+);
(Ge 2+ , F 2+);
(Ge 2+ , Na 2+);
(Ge 2+ , Se 3+);
(Ge 2+ , Pd 3+);
(Ge 2+ , I 3+);
(Ge 3+ , V 5+);
(Ge 3+ , Se 5+);
(Ge 3+ , Pb 5+);
(As 1+ , Sc 2+);
(As 1+ , Y 2+);
(As 1+ , Zr 2+);
(As 1+ , Lu 2+);
(As 2+ , Co 3+);
(As 2+ , Ga 3+);
(As 2+ , Ge 3+);
(As 2+ , Tl 3+);
(As 3+ , Fe 4+);
(As 4+ , Sb 6+);
(Se 1+ , Al 2+);
(Se 1+ , Si 2+);
(Tc 1+ , Sr 2+);
(Tc 1+ , La 2+);
(Tc 1+ , Ce 2+);
(Tc 1+ , Pm 2+);
(Tc 1+ , Sm 2+);
(Tc 1+ , Eu 2+);
(Tc 1+ , Tb 2+);
(Tc 1+ , Dy 2+);
(Ru 1+ , Ca 2+);
(Ru 1+ , Eu 2+);
(Ru 1+ , Tb 2+);
(Ru 1+ , Dy 2+);
(Br 1+ , La 3+);
(Br 1+ , Au 2+);
(Br 3+ , He 2+);
(Br 3+ , Si 4+);
(Br 3+ , Ge 4+);
(Br 4+ , S 5+);
(Br 4+ , Cl 5+);
(Br 5+ , Sb 6+);
(Br 6+ , Ar 8+);
(Kr 1+ , B 2+);
(Kr 1+ , S 2+);
(Kr 1+ , Br 2+);
(Kr 1+ , Xe 2+);
(Kr 1+ , Nd 3+);
(Kr 1+ , Pm 3+);
(Kr 1+ , Tb 3+);
(Kr 2+ , Kr 3+);
(Kr 2+ , Tb 4+);
(Kr 3+ , O 3+);
(Kr 3+ , Ni 4+);
(Kr 3+ , Kr 4+);
(Kr 3+ , Nb 5+);
(Kr 4+ , Zr 5+);
(Kr 5+ , Sr 6+);
(Kr 6+ , Y 7+);
(Rb 1+ , Nb 3+);
(Rb 2+ , Te 4+);
(Rb 2+ , Sm 4+);
(Rb 2+ , Gd 4+);
(Rb 2+ , Dy 4+);
(Rb 2+ , Ho 4+);
(Rb 2+ , Er 4+);
(Rb 3+ , Mg 3+);
(Rb 3+ , Te 5+);
(Rb 5+ , Rb 6+);
(Rb 6+ , Te 7+);
(Sr 1+ , Be 2+);
(Sr 1+ , Zn 2+);
(Sn 1+ , Er 2+);
(Sn 2+ , N 2+);
(Sn 2+ , Ar 2+);
(Sn 2+ , V 3+);
(Sn 2+ , Mo 3+);
(Sn 3+ , Mn 4+);
(Sn 3+ , Fe 4+);
(Sn 3+ , Co 4+);
(Sb 2+ , Ti 3+);
(Sb 2+ , Sb 3+);
(Sb 2+ , Bi 3+);
(Sb 3+ , C 3+);
(Sr 4+ , Cu 5+);
(Y 2+ , Sr 3+);
(Y 2+ , Cd 3+);
(Y 3+ , Se 5+);
(Y 3+ , Pb 5+);
(Y 4+ , Ti 5+);
(Y 4+ , Zn 5+);
(Y 5+ , Co 6+);
(Y 6+ , K 7+);
(Zr 2+ , P 2+);
(Zr 2+ , Ag 2+);
(Zr 2+ , I 2+);
(Zr 2+ , Cs 2+);
(Zr 2+ , La 3+);
(Zr 2+ , Au 2+);
(Zr 2+ , Hg 2+);
(Nb 2+ , C 2+);
(Nb 2+ , K 2+);
(Nb 2+ , Zr 3+);
(Nb 2+ , Eu 3+);
(Nb 2+ , Tm 3+);
(Nb 2+ , Lu 3+);
(Nb 3+ , Kr 3+);
(Nb 3+ , Pr 4+);
(Nb 3+ , Tb 4+);
(Nb 4+ , N 4+);
(Mo 1+ , Ba 2+);
(Mo 1+ , Pr 2+);
(Mo 1+ , Nd 2+);
(Mo 1+ , Ra 2+);
(Mo 2+ , Ru 3+);
(Mo 2+ , Sn 3+);
(Mo 3+ , Cr 4+);
(Mo 3+ , Ge 4+);
(Mo 4+ , Bi 5+);
(Mo 5+ , Mn 6+);
(Mo 6+ , O 6+);
(Mo 6+ , Cr 7+);
(Pr 2+ , Xe 2+);
(Pr 2+ , Pr 3+);
(Pr 2+ , Nd 3+);
(Pr 2+ , Pm 3+);
(Pr 2+ , Gd 3+);
(Pr 2+ , Tb 3+);
(Nd 2+ , Sm 3+);
(Nd 2+ , Dy 3+);
(Nd 2+ , Ho 3+);
(Nd 2+ , Er 3+);
(Nd 2+ , Lu 3+);
(Pm 2+ , C 2+);

142

a5

(Ru 1+ , Ho 2+);
(Ru 1+ , Er 2+);
(Rh 1+ , V 2+);
(Rh 1+ , Nb 2+);
(Rh 1+ , Sn 2+);
(Rh 1+ , Hf 2+);
(Pd 1+ , Al 2+);
(Pd 1+ , Si 2+);
(Pd 1+ , Fe 2+);
(Pd 1+ , Co 2+);
(Pd 1+ , Ru 2+);
(Pd 1+ , In 2+);
(Pd 1+ , Sb 2+);
(Pd 1+ , Bi 2+);
(Ag 1+ , Cu 2+);
(Ag 1+ , As 2+);
(Ag 1+ , Ag 2+);
(Ag 1+ , Cs 2+);
(Ag 1+ , Hg 2+);
(Cd 1+ , Zn 2+);
(Cd 1+ , Ga 2+);
(Cd 1+ , Cd 2+);
(Cd 1+ , Tl 2+);
(In 1+ , Sc 2+);
(In 1+ , Y 2+);
(In 1+ , Yb 2+);
(In 1+ , Lu 2+);
(In 2+ , Sr 3+);
(In 2+ , Cd 3+);
(Sn 1+ , Ca 2+);
(Sn 1+ , Sr 2+);
(Sn 1+ , La 2+);
(Sn 1+ , Sm 2+);
(Sn 1+ , Eu 2+);
(Sn 1+ , Tb 2+);
(Sn 1+ , Dy 2+);
(Sn 1+ , Ho 2+);
(Lu 2+ , Hf 3+);
(Hf 2+ , As 2+);
(Hf 2+ , Ag 2+);
(Hf 2+ , I 2+);
(Hf 2+ , Cs 2+);
(Hf 2+ , Hg 2+);
(Hg 1+ , Al 2+);
(Hg 1+ , Si 2+);
(Hg 1+ , Co 2+);
(Hg 1+ , Ni 2+);
(Hg 1+ , Rh 2+);
(Hg 1+ , Cd 2+);
(Hg 1+ , In 2+);
(Te 1+ , Sc 2+);
(Te 1+ , Y 2+);
(Te 1+ , Gd 2+);
(Te 1+ , Tm 2+);
(Te 1+ , Yb 2+);
(Te 1+ , Lu 2+);
(Te 2+ , Sc 3+);
(Te 2+ , Kr 2+);
(Te 2+ , Yb 3+);
(Te 2+ , Hf 3+);
(Te 3+ , Ar 3+);
(Te 3+ , La 4+);
(Te 3+ , Yb 4+);
(Te 4+ , Bi 5+);
(I 1+ , Al 2+);
(I 1+ , Si 2+);
(I 1+ , Fe 2+);
(I 1+ , Co 2+);
(I 1+ , Ge 2+);
(I 1+ , Ru 2+);
(I 1+ , In 2+);
(I 1+ , Bi 2+);
(Xe 1+ , Al 2+);
(Xe 1+ , Co 2+);
(Xe 1+ , Ni 2+);
(Xe 1+ , Rh 2+);
(Xe 1+ , Cd 2+);
(Xe 1+ , Sb 2+);
(La 2+ , Ti 3+);
(La 2+ , Sb 3+);
(Ce 2+ , Ag 2+);
(Ce 2+ , I 2+);
(Ce 2+ , Cs 2+);
(Ce 2+ , Au 2+);
(Ce 2+ , Hg 2+);
(Pr 2+ , B 2+);
(Pr 2+ , Y 3+);
(Pb 2+ , As 3+);
(Pb 2+ , In 3+);
(Pb 2+ , Te 3+);
(Pb 2+ , Pb 3+);
(Pb 3+ , Br 4+);
(Bi 1+ , Ba 2+);
(Bi 2+ , Ar 2+);
(Bi 2+ , Mo 3+);
(Bi 3+ , Se 4+);
(Bi 3+ , Mo 4+);
(Bi 3+ , Pb 4+);
(Bi 4+ , P 5+);
(Bi 4+ , Kr 5+);
(Pm 2+ , K 2+);
(Pm 2+ , Zr 3+);
(Pm 2+ , Eu 3+);
(Pm 2+ , Tm 3+);
(Sm 2+ , Cl 2+);
(Sm 2+ , Sc 3+);
(Sm 2+ , Yb 3+);
(Eu 2+ , Nb 3+);
(Gd 2+ , Cl 2+);
(Gd 2+ , Sc 3+);
(Gd 2+ , Eu 3+);
(Gd 2+ , Yb 3+);
(Tb 2+ , B 2+);
(Tb 2+ , S 2+);
(Tb 2+ , Br 2+);
(Tb 2+ , Xe 2+);
(Tb 2+ , Sm 3+);
(Tb 2+ , Tb 3+);
(Tb 2+ , Dy 3+);
(Tb 2+ , Ho 3+);
(Tb 2+ , Er 3+);
(Dy 2+ , Cl 2+);
(Dy 2+ , K 2+);
(Dy 2+ , Zr 3+);
(Dy 2+ , Eu 3+);
(Dy 2+ , Yb 3+);
(Ho 2+ , Sc 3+);
(Ho 2+ , Yb 3+);
(Ho 2+ , Hf 3+);
(Er 2+ , Sc 3+);
(Er 2+ , Yb 3+);
(Er 2+ , Hf 3+);
(Tm 2+ , Kr 2+);
(Tm 2+ , Nb 3+);
(Tm 2+ , Hf 3+);
(Yb 2+ , Ti 3+);
(Lu 2+ , Kr 2+);
(Tl 1+ , Mg 2+);
(Tl 1+ , Mn 2+);
(Tl 1+ , Mo 2+);
(Tl 1+ , Tc 2+);
(Tl 1+ , Sn 2+);
(Tl 1+ , Pb 2+);
(Pb 1+ , Sc 2+);
(Pb 1+ , Y 2+);
(Pb 1+ , Lu 2+); and
(Pb 2+ , Fe 3+).

143

(Hg 1+ , Sb 2+); (Bi 4+ , Zr 5+);

109. A method according to claim 93, further comprising forming said hydrino atoms from hydrogen atoms by use of a catalyst comprising at least one free atom selected from the group consisting of Be, Cu, Zn, Pd, Te and Pt.

110. A method according to claim 93, further comprising forming hydrino atoms from hydrogen atoms by use of a catalyst comprising at least one set of two species selected from the group consisting of:

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(Li 0+ , Ar 5+);	(P 1+ , Nd 4+);	(Ti 2+ , As 5+);
(Li 0+ , Mo 6+);	(P 1+ , Tb 4+);	(Ti 2+ , Se 5+);
(Be 0+ , Kr 5+);	(P 3+ , Na 5+);	(V 1+ , Cd 3+);
(B 0+ , Sc 3+);	(S 0+ , Sm 3+);	(V 1+ , I 3+);
(B 0+ , Zr 3+);	(S 0+ , Dy 3+);	(V 1+ , Hg 3+);
(B 0+ , Yb 3+);	(S 0+ , Ho 3+);	(V 2+ , Kr 4+);
(C 0+ , Te 3+);	(S 0+ , Er 3+);	(V 2+ , Nb 5+);
(C 0+ , Tl 3+);	(S 0+ , Lu 3+);	(V 4+ , Ni 7+);
(N 0+ , Ag 3+);	(S 1+ , Nb 4+);	(V 4+ , Kr 8+);
(N 0+ , Cd 3+);	(S 1+ , Ho 4+);	(Cr 1+ , S 3+);
(N 0+ , Hg 3+);	(S 1+ , Er 4+);	(Cr 1+ , Ca 3+);
(N 1+ , Bi 5+);	(S 1+ , Tm 4+);	(Cr 3+ , Be 3+);
(N 2+ , Br 6+);	(S 2+ , Bi 5+);	(Cr 3+ , Zn 5+);
(N 2+ , Kr 6+);	(Cl 0+ , Ti 3+);	(Cr 5+ , Cu 8+);
(O 0+ , Cl 3+);	(Cl 1+ , Mo 4+);	(Mn 1+ , Nd 4+);
(O 0+ , Kr 3+);	(Cl 1+ , Pb 4+);	(Mn 1+ , Tb 4+);
(O 0+ , Sm 4+);	(Cl 3+ , Sc 5+);	(Mn 2+ , Ca 4+);
(O 0+ , Dy 4+);	(Cl 4+ , Br 7+);	(Mn 3+ , Nb 6+);
(O 2+ , Na 4+);	(Ar 0+ , Mn 3+);	(Mn 5+ , Ca 8+);
(O 2+ , Cl 6+);	(Ar 0+ , As 3+);	(Fe 1+ , Nd 4+);
(O 2+ , Mn 6+);	(Ar 0+ , Rh 3+);	(Fe 1+ , Pm 4+);
(O 3+ , Al 5+);	(Ar 0+ , Tl 3+);	(Fe 1+ , Tb 4+);
(F 0+ , Bi 4+);	(Ar 1+ , Mn 4+);	(Fe 3+ , Ne 4+);
(F 1+ , Mn 5+);	(Ar 1+ , In 4+);	(Fe 5+ , Mo 8+);
(F 3+ , Mg 5+);	(Ar 5+ , Mg 5+);	(Co 1+ , Pm 4+);
(F 4+ , Ti 8+);	(K 0+ , Al 3+);	(Co 2+ , C 4+);
(Ne 1+ , Ge 5+);	(K 0+ , Cr 3+);	(Co 3+ , Mg 4+);
(Ne 4+ , Al 6+);	(K 0+ , Pb 3+);	(Ni 1+ , La 4+);
(Na 0+ , Cr 4+);	(K 1+ , Sc 4+);	(Ni 1+ , Yb 4+);
(Na 0+ , Ge 4+);	(K 2+ , Cl 5+);	(Ni 1+ , Lu 4+);
(Na 1+ , Sc 5+);	(Ca 0+ , Eu 3+);	(Ni 2+ , K 4+);
(Na 1+ , Bi 6+);	(Ca 0+ , Dy 3+);	(Ni 5+ , Fe 8+);
(Na 3+ , Ne 6+);	(Ca 0+ , Ho 3+);	(Cu 0+ , Ce 3+);
(Na 4+ , Ne 7+);	(Ca 0+ , Er 3+);	(Cu 0+ , Pr 3+);
(Mg 0+ , Kr 3+);	(Ca 1+ , Mg 3+);	(Cu 1+ , Ar 3+);

144

(Mg 2+ , Al 5+); (Ca 1+ , Fe 4+); (Cu 1+ , Ti 4+);
(Mg 3+ , Na 6+); (Ca 1+ , Co 4+); (Cu 1+ , Te 4+);
(Al 1+ , Zr 5+); (Ca 3+ , Co 6+); (Cu 2+ , Sn 5+);
(Al 3+ , Mg 6+); (Ca 3+ , Y 6+); (Zn 0+ , Y 3+);
(Al 3+ , Cr 8+); (Sc 1+ , C 3+); (Zn 0+ , Pm 3+);
(Si 1+ , Zn 3+); (Sc 1+ , Te 4+); (Zn 0+ , Gd 3+);
(Si 1+ , Ce 4+); (Ti 1+ , Mn 3+); (Zn 0+ , Tb 3+);
(Si 2+ , Na 4+); (Ti 1+ , Ga 3+); (Zn 1+ , Mo 4+);
(Si 2+ , Cl 6+); (Ti 1+ , As 3+); (Zn 1+ , Pb 4+);
(Si 3+ , Be 4+); (Ti 1+ , Rh 3+); (Zn 2+ , N 4+);
(Si 5+ , N 6+); (Ti 1+ , Tl 3+); (Zn 2+ , Kr 5+);
(Zn 3+ , N 5+); (Y 5+ , Co 7+); (Ce 1+ , Ho 3+);
(Zn 5+ , Co 8+); (Zr 1+ , Zr 3+); (Ce 1+ , Er 3+);
(Ga 1+ , Bi 4+); (Zr 2+ , Sc 4+); (Ce 1+ , Lu 3+);
(Ge 1+ , S 3+); (Zr 2+ , Sr 4+); (Pr 1+ , Sc 3+);
(Ge 1+ , Ce 4+); (Nb 1+ , Mo 3+); (Pr 1+ , Zr 3+);
(As 1+ , Ca 3+); (Nb 1+ , Sb 3+); (Pr 1+ , Yb 3+);
(As 1+ , Br 3+); (Nb 1+ , Bi 3+); (Nd 1+ , Nb 3+);
(As 2+ , F 3+); (Nb 2+ , Sn 4+); (Nd 1+ , Hf 3+);
(As 2+ , Kr 4+); (Nb 2+ , Sb 4+); (Pm 1+ , Nb 3+);
(As 2+ , Nb 5+); (Nb 3+ , Co 5+); (Sm 1+ , Ti 3+);
(Se 1+ , Zn 3+); (Nb 3+ , Rb 5+); (Eu 1+ , V 3+);
(Se 1+ , Ce 4+); (Nb 4+ , Zn 6+); (Eu 1+ , Mo 3+);
(Se 2+ , Kr 4+); (Mo 1+ , Se 3+); (Eu 1+ , Sb 3+);
(Se 2+ , Nb 5+); (Mo 1+ , I 3+); (Gd 1+ , Bi 3+);
(Se 3+ , Ni 5+); (Mo 4+ , Fe 6+); (Tb 1+ , Hf 3+);
(Se 4+ , Nb 7+); (Mo 5+ , Rb 8+); (Dy 1+ , Ti 3+);
(Br 0+ , Eu 3+); (Ag 0+ , La 3+); (Ho 1+ , Bi 3+);
(Br 0+ , Tm 3+); (Ag 0+ , Ce 3+); (Er 1+ , Bi 3+);
(Br 1+ , Nb 4+); (Cd 0+ , La 3+); (Tm 1+ , V 3+);
(Br 1+ , Gd 4+); (In 1+ , Nd 4+); (Tm 1+ , Mo 3+);
(Br 1+ , Ho 4+); (In 1+ , Tb 4+); (Tm 1+ , Sb 3+);
(Br 1+ , Er 4+); (Sn 1+ , Si 3+); (Yb 1+ , Al 3+);
(Br 2+ , F 3+); (Sn 1+ , Co 3+); (Yb 1+ , Ru 3+);
(Br 2+ , Ga 4+); (Sn 1+ , Ge 3+); (Yb 1+ , In 3+);
(Br 3+ , O 4+); (Sn 2+ , F 3+); (Yb 1+ , Sn 3+);
(Br 3+ , Al 4+); (Sn 2+ , Ga 4+); (Lu 1+ , Tc 3+);
(Br 4+ , N 5+); (Sb 1+ , Si 3+); (Lu 1+ , Ru 3+);
(Kr 0+ , Ti 3+); (Sb 1+ , Co 3+); (Lu 1+ , In 3+);
(Kr 1+ , Sn 4+); (Sb 1+ , Ge 3+); (Lu 1+ , Sn 3+);
(Kr 1+ , Sb 4+); (Sb 2+ , As 4+); (Hf 1+ , Sc 3+);
(Kr 2+ , Ne 3+); (Te 1+ , Mn 3+); (Hf 1+ , Yb 3+);
(Kr 2+ , Bi 5+); (Te 1+ , As 3+); (Hg 0+ , La 3+);
(Kr 3+ , O 4+); (Te 1+ , Rh 3+); (Pb 1+ , Ni 3+);
(Kr 3+ , Al 4+); (Te 1+ , Te 3+); (Pb 1+ , Se 3+);
(Kr 4+ , Ar 6+); (Te 1+ , Tl 3+); (Pb 2+ , F 3+);
(Rb 0+ , Sc 3+); (Te 2+ , Cr 4+); (Pb 2+ , Ga 4+);
(Rb 0+ , Zr 3+); (Te 2+ , Ge 4+); (Bi 1+ , P 3+);
(Rb 0+ , Yb 3+); (Te 2+ , As 4+); (Bi 1+ , Sr 3+);
(Rb 1+ , N 3+); (Te 3+ , Zr 5+); (La 1+ , Ru 3+);

a5

145

(Sr	1+	, C	3+);	(Te	4+	, Ni	6+);	(La	1+	, In	3+);
(Sr	1+	, Ar	3+);	(Te	4+	, Cu	6+);	(La	1+	, Sn	3+);
(Sr	1+	, Ti	4+);	(Xe	0+	, Pr	3+);	(Ce	1+	, Sm	3+); and
(Sr	1+	, Te	4+);	(Xe	0+	, Nd	3+);	(Ce	1+	, Dy	3+).
(Sr	3+	, Nb	6+);	(La	1+	, Tc	3+);				

111. A method according to claim 93,further comprising forming said hydrino atoms from hydrogen atoms by use of a catalyst comprising at least one pair selected from the group consisting of:

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(Ne 1 +	, H 1 +),	(Kr 3 +	, B 2 +),	(Tm 3 +	, N 1 +),
(Ar 2 +	, H 1 +),	(Rb 3 +	, B 2 +),	(Pb 3 +	, N 1 +),
(Sn 3 +	, H 1 +),	(B 2 +	, P 1 +),	(Sr 3 +	, N 2 +),
(Pm 3 +	, H 1 +),	(P 4 +	, B 3 +),	(N 2 +	, P 2 +),
(Sm 3 +	, H 1 +),	(B 2 +	, S 1 +),	(Ar 4 +	, N 3 +),
(Dy 3 +	, H 1 +),	(V 4 +	, B 3 +),	(Fe 4 +	, N 3 +),
(Kr 3 +	, He 1 +),	(B 2 +	, As 1 +),	(Ni 4 +	, N 3 +),
(Rb 3 +	, He 1 +),	(B 2 +	, Se 1 +),	(N 2 +	, Cu 2 +),
(K 4 +	, He 2 +),	(B 2 +	, I 1 +),	(N 2 +	, Pd 2 +),
(Zn 4 +	, He 2 +),	(B 2 +	, Ba 2 +),	(N 2 +	, I 2 +),
(Se 5 +	, He 2 +),	(B 2 +	, Ce 2 +),	(N 2 +	, La 3 +),
(He 1 +	, Rb 2 +),	(B 2 +	, Pr 2 +),	(N 2 +	, Ce 3 +),
(Zr 4 +	, He 2 +),	(B 2 +	, Nd 2 +),	(N 2 +	, Tl 2 +),
(He 1 +	, Mo 3 +),	(B 2 +	, Pm 2 +),	(N 3 +	, Cr 4 +),
(Si 2 +	, Li 1 +),	(B 2 +	, Hg 1 +),	(N 3 +	, As 4 +),
(Mn 2 +	, Li 1 +),	(B 2 +	, Rn 1 +),	(N 3 +	, La 4 +),
(Co 2 +	, Li 1 +),	(B 2 +	, Ra 2 +),	(Ne 4 +	, N 5 +),
(Pd 2 +	, Li 1 +),	(Cl 2 +	, C 1 +),	(Fe 6 +	, N 5 +),
(I 2 +	, Li 1 +),	(Zn 2 +	, C 1 +),	(Kr 7 +	, N 5 +),
(Hf 3 +	, Li 1 +),	(Nb 3 +	, C 1 +),	(Nb 6 +	, N 5 +),
(Li 1 +	, C 3 +),	(Pr 3 +	, C 1 +),	(N 4 +	, Te 6 +),
(Li 1 +	, N 3 +),	(Kr 3 +	, C 2 +),	(Ne 1 +	, O 1 +),
(Li 1 +	, Na 2 +),	(Rb 3 +	, C 2 +),	(Ar 2 +	, O 1 +),
(Li 1 +	, S 4 +),	(C 2 +	, P 2 +),	(Sn 3 +	, O 1 +),
(Cu 5 +	, Li 2 +),	(Ar 4 +	, C 3 +),	(Pm 3 +	, O 1 +),
(Li 1 +	, Br 4 +),	(Fe 4 +	, C 3 +),	(Sm 3 +	, O 1 +),
(Br 6 +	, Li 2 +),	(Ni 4 +	, C 3 +),	(Dy 3 +	, O 1 +),
(V 6 +	, Li 3 +),	(C 2 +	, Cu 2 +),	(F 2 +	, O 2 +),
(Li 2 +	, Mn 6 +),	(C 2 +	, Ga 2 +),	(Ne 2 +	, O 2 +),
(Cu 2 +	, Be 1 +),	(C 2 +	, Y 3 +),	(O 1 +	, Mg 1 +),
(Kr 2 +	, Be 1 +),	(C 2 +	, Pd 2 +),	(O 1 +	, Ti 1 +),
(Cd 2 +	, Be 1 +),	(C 2 +	, Ce 3 +),	(O 1 +	, V 1 +),
(Te 3 +	, Be 1 +),	(C 2 +	, Gd 3 +),	(O 1 +	, Cr 1 +),
(Ce 3 +	, Be 1 +),	(C 2 +	, Au 2 +),	(O 1 +	, Mn 1 +),
(K 2 +	, Be 2 +),	(C 2 +	, Tl 2 +),	(O 1 +	, Fe 1 +),

146

(V 3+ , Be 2+), (Sc 4+ , C 4+), (O 1+ , Co 1+),
(Ge 3+ , Be 2+), (C 3+ , Cu 3+), (O 1+ , Ni 1+),
(Mo 3+ , Be 2+), (C 3+ , Br 3+), (O 1+ , Cu 1+),
(Bi 3+ , Be 2+), (C 3+ , Kr 3+), (O 1+ , Ge 1+),
(Be 2+ , Ne 5+), (C 3+ , Cd 3+), (O 1+ , Zr 1+),
(Be 2+ , Kr 8+), (C 3+ , Te 4+), (O 1+ , Nb 1+),
(Be 2+ , Mo 7+), (C 3+ , Ce 4+), (O 1+ , Mo 1+),
(Be 3+ , Al 6+), (Se 3+ , N 1+), (O 1+ , Tc 1+),
(Br 2+ , B 1+), (Eu 3+ , N 1+), (O 1+ , Ru 1+),
(Ce 3+ , B 1+), (Ho 3+ , N 1+), (O 1+ , Rh 1+),
(Cl 3+ , B 2+), (Er 3+ , N 1+), (O 1+ , Ag 1+),
(O 1+ , Sn 1+), (Ar 5+ , F 3+), (Hf 3+ , Na 1+),
(O 1+ , Ta 1+), (Cr 5+ , F 3+), (Na 1+ , Al 2+),
(O 1+ , W 1+), (F 2+ , Ni 3+), (Na 1+ , P 2+),
(O 1+ , Re 1+), (F 2+ , Ge 3+), (Ar 4+ , Na 2+),
(O 1+ , Pb 1+), (Sr 5+ , F 3+), (Fe 4+ , Na 2+),
(O 1+ , Bi 1+), (F 2+ , Zr 4+), (Ni 4+ , Na 2+),
(O 2+ , Ar 2+), (F 2+ , Ag 3+), (Na 1+ , Pd 2+),
(K 4+ , O 3+), (F 4+ , F 4+), (Na 1+ , In 2+),
(O 2+ , Ti 3+), (Cl 6+ , F 4+), (Na 1+ , I 2+),
(Zn 4+ , O 3+), (F 3+ , Ar 4+), (Na 1+ , La 3+),
(O 2+ , Rb 2+), (F 3+ , Zn 4+), (Na 1+ , Ce 3+),
(O 2+ , Mo 3+), (F 3+ , Br 5+), (Na 3+ , Na 3+),
(O 3+ , Cr 4+), (F 3+ , Te 5+), (K 5+ , Na 3+),
(O 3+ , As 4+), (F 4+ , F 4+), (Na 2+ , Ti 4+),
(O 3+ , La 4+), (Mg 4+ , F 5+), (Ti 4+ , Na 3+),
(Mg 4+ , O 5+), (F 6+ , F 6+), (Fe 5+ , Na 3+),
(O 5+ , Sc 6+), (Cr 7+ , F 6+), (Rb 6+ , Na 3+),
(Cu 7+ , O 6+), (F 5+ , Co 7+), (Na 2+ , Sr 3+),
(O 5+ , Kr 7+), (F 5+ , Y 8+), (Na 2+ , Sb 4+),
(Si 3+ , F 1+), (F 6+ , F 6+), (Na 2+ , Gd 4+),
(K 2+ , F 1+), (F 6+ , Ne 6+), (Na 2+ , Yb 4+),
(Ge 3+ , F 1+), (F 6+ , Co 8+), (Na 3+ , Na 3+),
(Lu 3+ , F 1+), (Cr 3+ , Ne 1+), (Kr 7+ , Na 4+),
(Bi 3+ , F 1+), (La 3+ , Ne 1+), (Na 3+ , Rb 5+),
(F 2+ , F 2+), (Ne 1+ , Cl 1+), (Na 3+ , Sr 5+),
(Ne 2+ , F 2+), (Ne 1+ , Sc 2+), (Mo 6+ , Na 4+),
(F 1+ , Mg 1+), (Ne 1+ , Ti 2+), (Na 3+ , Te 6+),
(F 1+ , Sc 1+), (Cr 4+ , Ne 2+), (Si 4+ , Na 5+),
(F 1+ , Ti 1+), (Se 4+ , Ne 2+), (Na 4+ , Sc 6+),
(F 1+ , V 1+), (Ne 1+ , Zr 2+), (Cu 7+ , Na 5+),
(F 1+ , Cr 1+), (Mo 5+ , Ne 2+), (Na 4+ , Kr 7+),
(F 1+ , Mn 1+), (Ne 1+ , Lu 2+), (S 2+ , Mg 1+),
(F 1+ , Fe 1+), (Pb 4+ , Ne 2+), (Ni 2+ , Mg 1+),
(F 1+ , Co 1+), (Ar 5+ , Ne 3+), (Br 2+ , Mg 1+),
(F 1+ , Ni 1+), (Sc 4+ , Ne 3+), (Ag 2+ , Mg 1+),
(F 1+ , Cu 1+), (Cr 5+ , Ne 3+), (Ti 3+ , Mg 2+),
(F 1+ , Ge 1+), (Ne 2+ , Ni 3+), (Se 3+ , Mg 2+),
(F 1+ , Zr 1+), (Ne 2+ , Br 3+), (Eu 3+ , Mg 2+),
(F 1+ , Nb 1+), (Sr 5+ , Ne 3+), (Ho 3+ , Mg 2+),

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(F 1 + , Mo 1 +), (Ar 6 + , Ne 4 +), (Er 3 + , Mg 2 +),
(F 1 + , Tc 1 +), (Ne 3 + , Cr 5 +), (Tm 3 + , Mg 2 +),
(F 1 + , Ru 1 +), (Fe 6 + , Ne 4 +), (Pb 3 + , Mg 2 +),
(F 1 + , Rh 1 +), (Nb 6 + , Ne 4 +), (Ni 5 + , Mg 3 +),
(F 1 + , Ag 1 +), (Ne 3 + , Pb 5 +), (Zn 5 + , Mg 3 +),
(F 1 + , Sn 1), (Ne 4 + , Na 4 +), (Mg 2 + , Kr 4 +),
(F 1 + , Hf 1 +), (Al 4 + , Ne 5 +), (Mg 2 + , Rb 4 +),
(F 1 + , Ta 1 +), (Ne 4 + , Fe 6 +), (Sb 5 + , Mg 3 +),
(F 1 + , Re 1 +), (Ne 4 + , Rb 7 +), (Mg 3 + , Se 6 +),
(F 1 + , Pb 1 +), (Si 2 + , Na 1 +), (Mg 3 + , Zr 5 +),
(F 1 + , Bi 1 +), (Co 2 + , Na 1 +), (Te 6 + , Mg 4 +),
(F 2 + , F 2 +), (Pd 2 + , Na 1 +), (Mg 4 + , Cl 7 +),
(F 2 + , S 3 +), (I 2 + , Na 1 +), (Ti 7 + , Mg 5 +),
(Mg 5 + , Sc 8 +), (Si 2 + , Ac 1 +), (S 2 + , Ti 1 +),
(Mg 6 + , Mn 8 +), (Si 2 + , Th 1 +), (S 2 + , V 1 +),
(Si 2 + , Al 1 +), (Si 2 + , Pa 1 +), (S 2 + , Cr 1 +),
(Mn 2 + , Al 1 +), (Si 2 + , U 1 +), (S 2 + , Mn 1 +),
(Co 2 + , Al 1 +), (Si 2 + , Np 1 +), (S 2 + , Ni 1 +),
(Ge 2 + , Al 1 +), (Si 2 + , Pu 1 +), (S 2 + , Cu 1 +),
(Zr 3 + , Al 1 +), (Si 2 + , Am 1 +), (S 2 + , Y 1 +),
(I 2 + , Al 1 +), (Si 2 + , Cm 1 +), (S 2 + , Zr 1 +),
(Hf 3 + , Al 1 +), (Si 2 + , Bk 1 +), (S 2 + , Nb 1 +),
(Hg 2 + , Al 1 +), (Si 2 + , Cf 1 +), (S 2 + , Mo 1 +),
(S 3 + , Al 2 +), (Si 2 + , Es 1 +), (S 2 + , Tc 1 +),
(V 3 + , Al 2 +), (S 4 + , Si 4 +), (S 2 + , Ru 1 +),
(Br 3 + , Al 2 +), (Sc 3 + , Si 4 +), (S 2 + , Rh 1 +),
(Mo 3 + , Al 2 +), (Mn 4 + , Si 4 +), (S 2 + , Ag 1 +),
(Sb 4 + , Al 3 +), (Si 3 + , Co 2 +), (S 2 + , Sn 1 +),
(Bi 4 + , Al 3 +), (Si 3 + , Zn 2 +), (S 2 + , Hf 1 +),
(Ca 7 + , Al 4 +), (Si 3 + , Ru 2 +), (S 2 + , Pb 1 +),
(Al 3 + , Sc 5 +), (Si 3 + , Rh 2 +), (S 2 + , Bi 1 +),
(Al 4 + , Kr 8 +), (Si 3 + , Cd 2 +), (S 2 + , Es 1 +),
(Al 5 + , Ni 8 +), (Sn 4 + , Si 4 +), (Ar 4 + , S 4 +),
(Ni 2 + , Si 1 +), (Si 3 + , Bi 2 +), (Fe 4 + , S 4 +),
(Br 2 + , Si 1 +), (Si 4 + , Cu 7 +), (Ni 4 + , S 4 +),
(Sr 2 + , Si 2 +), (Nb 3 + , P 1 +), (S 3 + , Cu 2 +),
(Sb 3 + , Si 2 +), (Pr 3 + , P 1 +), (S 3 + , Pd 2 +),
(Gd 3 + , Si 2 +), (S 3 + , P 2 +), (S 3 + , In 2 +),
(Yb 3 + , Si 2 +), (Br 3 + , P 2 +), (S 3 + , I 2 +),
(K 3 + , Si 3 +), (P 3 + , S 2 +), (S 3 + , La 3 +),
(Si 2 + , Ca 1 +), (P 3 + , Cl 2 +), (S 3 + , Ce 3 +),
(Si 2 + , Ga 1 +), (Co 4 + , P 4 +), (K 5 + , S 5 +),
(Si 2 + , Sr 1 +), (P 3 + , Kr 2 +), (S 4 + , Sb 4 +),
(Si 2 + , Y 1 +), (Kr 5 + , P 4 +), (S 4 + , Lu 4 +),
(Y 3 + , Si 3 +), (P 3 + , Zr 3 +), (S 4 + , Bi 4 +),
(Mo 4 + , Si 3 +), (P 3 + , Sm 3 +), (S 5 + , Ar 4 +),
(Si 2 + , In 1 +), (P 3 + , Tm 3 +), (S 5 + , K 4 +),
(Si 2 + , Ba 1 +), (P 3 + , Hf 3 +), (S 5 + , Br 5 +),
(Si 2 + , La 1 +), (P 4 + , Cu 3 +), (Y 6 + , S 6 +),
(Si 2 + , Ce 1 +), (Ge 4 + , P 5 +), (Ar 2 + , Cl 1 +),

148

(Si 2 + , Pr 1 +), (P 4 + , Kr 3 +), (Rb 2 + , Cl 1 +),
(Si 2 + , Nd 1 +), (Y 5 + , P 5 +), (Sn 3 + , Cl 1 +),
(Si 2 + , Pm 1 +), (P 4 + , Cd 3 +), (Nd 3 + , Cl 1 +),
(Si 2 + , Sm 1 +), (P 4 + , Te 4 +), (Pm 3 + , Cl 1 +),
(Si 2 + , Eu 1 +), (P 4 + , Ce 4 +), (Sm 3 + , Cl 1 +),
(Si 2 + , Gd 1 +), (P 5 + , Br 8 +), (Ca 2 + , Cl 2 +),
(Si 2 + , Tb 1 +), (P 7 + , S 7 +), (Mn 3 + , Cl 2 +),
(Si 2 + , Dy 1 +), (Nb 3 + , S 1 +), (Co 3 + , Cl 2 +),
(Si 2 + , Ho 1 +), (Cd 2 + , S 1 +), (Cl 4 + , Cl 3 +),
(Si 2 + , Er 1 +), (Te 3 + , S 1 +), (Cl 2 + , Ca 2 +),
(Si 2 + , Tm 1 +), (Ca 2 + , S 2 +), (Ca 3 + , Cl 3 +),
(Si 2 + , Yb 1 +), (Mn 3 + , S 2 +), (Cl 2 + , Br 1 +),
(Si 2 + , Lu 1 +), (Co 3 + , S 2 +), (Cl 2 + , Y 2 +),
(Si 2 + , Tl 1 +), (Nb 4 + , S 2 +), (Mo 5 + , Cl 3 +),
(Si 2 + , Ra 1 +), (S 2 + , Sc 1 +), (Cl 2 + , Xe 1 +),
(Cl 2 + , Eu 2 +), (Br 6 + , Ar 5 +), (Pr 3 + , Ca 2 +),
(Cl 2 + , Gd 2 +), (Nb 5 + , Ar 5 +), (Tb 3 + , Ca 2 +),
(Cl 2 + , Tb 2 +), (Ti 5 + , Ar 6 +), (Kr 5 + , Ca 3 +),
(Cl 2 + , Dy 2 +), (Mn 6 + , Ar 6 +), (Ca 2 + , Zr 3 +),
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(Cl 2 + , Ho 2 +), (Ar 5 + , Ga 4 +), (Ca 2 + , Sm 3 +),
(Cl 2 + , Er 2 +), (Ar 5 + , As 5 +), (Ca 2 + , Dy 3 +),
(Cl 2 + , Tm 2 +), (Ar 7 + , Y 7 +), (Ca 2 + , Ho 3 +),
(Cl 2 + , Yb 2 +), (K 1 + , K 1 +), (Ca 2 + , Er 3 +),
(Se 5 + , Cl 4 +), (Xe 2 + , K 1 +), (Ca 2 + , Tm 3 +),
(Zr 4 + , Cl 4 +), (Pb 2 + , K 1 +), (Ca 2 + , Hf 3 +),
(Cl 3 + , Nb 3 +), (K 1 + , K 1 +), (Mn 5 + , Ca 4 +),
(Cl 3 + , Sb 3 +), (Zn 3 + , K 2 +), (Ca 3 + , Zn 3 +),
(Cl 3 + , Cs 2 +), (Br 4 + , K 2 +), (Ca 3 + , Rb 3 +),
(Cl 3 + , Yb 3 +), (K 1 + , Rb 1 +), (Ca 3 + , Pr 4 +),
(Cl 3 + , Bi 3 +), (Te 4 + , K 2 +), (Ca 3 + , Tb 4 +),
(Cl 4 + , Cl 3 +), (K 1 + , Cs 1 +), (Ca 4 + , Sr 4 +),
(Cl 4 + , Ar 3 +), (Sc 3 + , K 3 +), (Ca 4 + , Sb 5 +),
(Mn 5 + , Cl 5 +), (K 2 + , Ni 2 +), (Ca 4 + , Bi 5 +),
(Cl 4 + , Zn 3 +), (K 2 + , Zn 2 +), (Ca 5 + , Se 6 +),
(Cl 4 + , Rb 3 +), (K 2 + , As 2 +), (Rb 7 + , Ca 6 +),
(Cl 4 + , Sn 4 +), (K 2 + , Rh 2 +), (Ca 5 + , Zr 5 +),
(Cl 4 + , Nd 4 +), (K 2 + , Te 2 +), (Te 6 + , Ca 6 +),
(Cl 4 + , Tb 4 +), (K 2 + , Pt 2 +), (Ca 6 + , Ti 5 +),
(Ar 6 + , Cl 6 +), (K 3 + , Mn 3 +), (Se 6 + , Ca 7 +),
(Cl 5 + , Cr 5 +), (K 3 + , Co 3 +), (Ca 7 + , Ti 6 +),
(Fe 6 + , Cl 6 +), (Br 5 + , K 4 +), (Ca 7 + , Mn 7 +),
(Nb 6 + , Cl 6 +), (K 3 + , Pd 3 +), (Mn 2 + , Sc 1 +),
(Cl 5 + , Pb 5 +), (K 3 + , I 3 +), (Ge 2 + , Sc 1 +),
(Ti 3 + , Ar 1 +), (K 3 + , Hf 4 +), (Zr 3 + , Sc 1 +),
(Se 3 + , Ar 1 +), (Bi 5 + , K 4 +), (Ag 2 + , Sc 1 +),
(Sr 2 + , Ar 1 +), (Sc 5 + , K 5 +), (Hg 2 + , Sc 1 +),
(Sb 3 + , Ar 1 +), (K 4 + , Fe 4 +), (Rb 2 + , Sc 2 +),
(Gd 3 + , Ar 1 +), (K 4 + , Ni 4 +), (Sn 3 + , Sc 2 +),
(Yb 3 + , Ar 1 +), (K 4 + , Cu 4 +), (Nd 3 + , Sc 2 +),
(Fe 3 + , Ar 2 +), (Kr 6 + , K 5 +), (Pm 3 + , Sc 2 +),

149

(Ni 3 + , Ar 2 +), (Ca 6 + , K 6 +), (Kr 3 + , Sc 3 +),
(Cu 3 + , Ar 2 +), (V 5 + , K 6 +), (Rb 3 + , Sc 3 +),
(Sb 4 + , Ar 2 +), (K 5 + , Mn 5 +), (Sc 3 + , Ge 4 +),
(Bi 4 + , Ar 2 +), (As 5 + , K 6 +), (Sc 3 + , Mo 4 +),
(Ar 2 + , Sc 2 +), (K 5 + , Sr 5 +), (Sc 3 + , Lu 4 +),
(Ar 2 + , Ti 2 +), (K 5 + , Sn 5 +), (Sc 3 + , Bi 4 +),
(Se 4 + , Ar 3 +), (K 7 + , Ca 7 +), (Ti 5 + , Sc 5 +),
(Ar 2 + , Zr 2 +), (K 7 + , As 6 +), (Mn 6 + , Sc 5 +),
(Mo 5 + , Ar 3 +), (K 7 + , Mo 7 +), (Sc 4 + , Ga 4 +),
(Pb 4 + , Ar 3 +), (Mn 2 + , Ca 1 +), (Sc 4 + , As 5 +),
(Ar 3 + , K 2 +), (Co 2 , Ca 1 +), (Cu 6 + , Sc 6 +),
(Ar 3 + , Xe 3 +), (Ge 2 + , Ca 1 +), (Cu 7 + , Sc 7 +),
(Ar 3 + , Pb 3 +), (Zr 3 + , Ca 1 +), (Ni 2 + , Ti 1 +),
(Bi 5 + , Ar 4 +), (Hf 3 + , Ca 1 +), (Ge 2 + , Ti 1 +),
(Ar 4 + , V 4 +), (Hg 2 + , Ca 1 +), (Zr 3 + , Ti 1 +),
(Cu 5 + , Ar 5 +), (Zn 2 + , Ca 2 +), (Ag 2 + , Ti 1 +),
(Ar 4 + , Br 4 +), (Rb 2 + , Ca 2 +), (Hg 2 + , Ti 1 +),
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(Sn 3 + , Ti 2 +), (Se 6 + , V 6 +), (Mn 2 + , Dy 1 +),
(Pm 3 + , Ti 2 +), (V 6 + , Sr 8 +), (Mn 2 + , Ho 1 +),
(Sm 3 + , Ti 2 +), (Ni 2 + , Cr 1 +), (Mn 2 + , Er 1 +),
(Dy 3 + , Ti 2 +), (Ge 2 + , Cr 1 +), (Mn 2 + , Tm 1 +),
(Fe 3 + , Ti 3 +), (Zr 3 + , Cr 1 +), (Mn 2 + , Yb 1 +),
(Ni 3 + , Ti 3 +), (Ag 2 + , Cr 1 +), (Mn 2 + , Lu 1 +),
(Cu 3 + , Ti 3 +), (Hg 2 + , Cr 1 +), (Mn 2 + , Hf 1 +),
(Ti 3 + , Mn 2 +), (Sr 2 + , Cr 2 +), (Mn 2 + , Tl 1 +),
(Ti 3 + , Fe 2 +), (Sb 3 + , Cr 2 +), (Mn 2 + , Ra 1 +),
(Ti 3 + , Ge 2 +), (Gd 3 + , Cr 2 +), (Mn 2 + , Ac 1 +),
(Rb 4 + , Ti 4 +), (Yb 3 + , Cr 2 +), (Mn 2 + , Th 1 +),
(Sr 4 + , Ti 4 +), (Zn 3 + , Cr 3 +), (Mn 2 + , Pa 1 +),
(Ti 3 + , Mo 2 +), (Te 4 + , Cr 3 +), (Mn 2 + , U 1 +),
(Ti 3 + , Tc 2 +), (Cr 2 + , Cs 1 +), (Mn 2 + , Np 1 +),
(Te 5 + , Ti 4 +), (Cr 3 + , Se 2 +), (Mn 2 + , Pu 1 +),
(Ti 3 + , Hf 2 +), (Cr 3 + , Br 2 +), (Mn 2 + , Am 1 +),
(Ti 3 + , Pb 2 +), (Y 4 + , Cr 4 +), (Mn 2 + , Cm 1 +),
(As 5 + , Ti 5 +), (Cr 3 + , Ag 2 +), (Mn 2 + , Bk 1 +),
(Ti 4 + , Rb 5 +), (Cr 3 + , Xe 2 +), (Mn 2 + , Cf 1 +),
(Ti 4 + , Sr 5 +), (Cr 3 + , Pr 3 +), (Mn 2 + , Es 1 +),
(Mo 6 + , Ti 5 +), (Cr 3 + , Gd 3 +), (Co 4 + , Mn 4 +),
(Ti 7 + , Ti 7 +), (Cr 3 + , Tb 3 +), (Kr 5 + , Mn 4 +),
(Ti 7 + , Ti 7 +), (Cr 3 + , Lu 3 +), (Mn 3 + , Zr 3 +),
(Mn 7 + , Ti 8 +), (Cr 4 + , Pm 4 +), (Mn 3 + , Sm 3 +),
(Ni 2 + , V 1 +), (Cr 4 + , Sm 4 +), (Mn 3 + , Dy 3 +),
(Ge 2 + , V 1 +), (Cr 4 + , Dy 4 +), (Mn 3 + , Ho 3 +),
(Zr 3 + , V 1 +), (Cr 6 + , Ni 7 +), (Mn 3 + , Er 3 +),
(Ag 2 + , V 1 +), (Cr 6 + , Zn 7 +), (Mn 3 + , Tm 3 +),
(Hg 2 + , V 1 +), (Cr 7 + , Co 8 +), (Mn 3 + , Hf 3 +),
(Se 3 + , V 2 +), (Ni 2 + , Mn 1 +), (Mn 4 + , Sb 4 +),
(Eu 3 + , V 2 +), (Ag 2 + , Mn 1 +), (Mn 4 + , Gd 4 +),
(Ho 3 + , V 2 +), (Se 3 + , Mn 2 +), (Mn 4 + , Lu 4 +),
(Er 3 + , V 2 +), (Sr 2 + , Mn 2 +), (Mn 4 + , Bi 4 +),

150

(Tm 3 + , V 2 +),	(Gd 3 + , Mn 2 +),	(Sr 7 + , Mn 6 +),
(Pb 3 + , V 2 +),	(Tm 3 + , Mn 2 +),	(Mn 6 + , Sr 6 +),
(Sr 3 + , V 3 +),	(Yb 3 + , Mn 2 +),	(Ni 2 + , Fe 1 +),
(Fe 4 + , V 4 +),	(Mn 2 + , Ga 1 +),	(Br 2 + , Fe 1 +),
(V 3 + , As 2 +),	(Mn 2 + , Sr 1 +),	(Sr 2 + , Fe 2 +),
(V 3 + , Pd 2 +),	(Mn 2 + , Y 1 +),	(Sb 3 + , Fe 2 +),
(V 3 + , In 2 +),	(Y 3 + , Mn 3 +),	(Gd 3 + , Fe 2 +),
(V 3 + , Te 2 +),	(Mo 4 + , Mn 3 +),	(Yb 3 + , Fe 2 +),
(V 3 + , I 2 +),	(Mn 2 + , In 1 +),	(Te 4 + , Fe 3 +),
(V 3 + , La 3 +),	(Mn 2 + , Ba 1 +),	(Zn 4 + , Fe 4 +),
(V 3 + , Pt 2 +),	(Mn 2 + , La 1 +),	(Fe 3 + , Rb 2 +),
(V 3 + , Hg 2 +),	(Mn 2 + , Ce 1 +),	(Fe 3 + , Mo 3 +),
(V 4 + , Cu 3 +),	(Mn 2 + , Pr 1 +),	(Cu 5 + , Fe 5 +),
(Ge 4 + , V 5 +),	(Mn 2 + , Nd 1 +),	(Fe 4 + , Br 4 +),
(V 4 + , Kr 3 +),	(Mn 2 + , Pm 1 +),	(Br 6 + , Fe 5 +),
(Y 5 + , V 5 +),	(Mn 2 + , Sm 1 +),	(Nb 5 + , Fe 5 +),
(V 4 + , Cd 3 +),	(Mn 2 + , Eu 1 +),	(Fe 5 + , Rb 5 +),
(V 4 + , Te 4 +),	(Mn 2 + , Gd 1 +),	(Fe 5 + , Sr 5 +),
(V 4 + , Ce 4 +),	(Mn 2 + , Tb 1 +),	(Mo 6 + , Fe 6 +),
(Fe 5 + , Te 6 +),	(Co 7 + , Y 8 +),	(Zn 4 + , Cu 4 +),
(Mo 7 + , Fe 7 +),	(Ni 2 + , Ni 1 +),	(Cu 3 + , Rb 2 +),
(Ni 2 + , Co 1 +),	(Br 2 + , Ni 1 +),	(Cu 3 + , Mo 3 +),
(Br 2 + , Co 1 +),	(Ag 2 + , Ni 1 +),	(Cu 3 + , In 3 +),
(Sb 3 + , Co 2 +),	(Ge 3 + , Ni 2 +),	(Cu 3 + , Te 3 +),
(Lu 3 + , Co 2 +),	(Mo 3 + , Ni 2 +),	(Zn 5 + , Cu 5 +),
(Bi 3 + , Co 2 +),	(Lu 3 + , Ni 2 +),	(Cu 4 + , Kr 4 +),
(Co 2 + , Ga 1 +),	(Bi 3 + , Ni 2 +),	(Cu 4 + , Rb 4 +),
(Co 2 + , Sr 1 +),	(Ni 2 + , Ni 1 +),	(Sb 5 + , Cu 5 +),
(Co 2 + , Y 1 +),	(Ni 2 + , Cu 1 +),	(Cu 6 + , Kr 7 +),
(Y 3 + , Co 3 +),	(Ni 2 + , Ge 1 +),	(Kr 2 + , Zn 1 +),
(Mo 4 + , Co 3 +),	(As 4 + , Ni 3 +),	(Cd 2 + , Zn 1 +),
(Co 2 + , In 1 +),	(Ni 2 + , Zr 1 +),	(Te 3 + , Zn 1 +),
(Co 2 + , Ba 1 +),	(Ni 2 + , Nb 1 +),	(Ce 3 + , Zn 1 +),
(Co 2 + , La 1 +),	(Ni 2 + , Mo 1 +),	(Ge 3 + , Zn 2 +),
(Co 2 + , Ce 1 +),	(Ni 2 + , Tc 1 +),	(Mo 3 + , Zn 2 +),
(Co 2 + , Pr 1 +),	(Ni 2 + , Ru 1 +),	(Lu 3 + , Zn 2 +),
(Co 2 + , Nd 1 +),	(Ni 2 + , Rh 1 +),	(Bi 3 + , Zn 2 +),
(Co 2 + , Pm 1 +),	(Ni 2 + , Ag 1 +),	(Zn 2 + , Br 1 +),
(Co 2 + , Sm 1 +),	(Ni 2 + , Sn 1 +),	(Zn 2 + , Y 2 +),
(Co 2 + , Eu 1 +),	(Ni 2 + , Ta 1 +),	(Mo 5 + , Zn 3 +),
(Co 2 + , Gd 1 +),	(Ni 2 + , W 1 +),	(Zn 2 + , Xe 1 +),
(Co 2 + , Tb 1 +),	(Ni 2 + , Re 1 +),	(Zn 2 + , Eu 2 +),
(Co 2 + , Dy 1 +),	(Ni 2 + , Pb 1 +),	(Zn 2 + , Gd 2 +),
(Co 2 + , Ho 1 +),	(Ni 2 + , Bi 1 +),	(Zn 2 + , Tb 2 +),
(Co 2 + , Er 1 +),	(Zn 4 + , Ni 4 +),	(Zn 2 + , Dy 2 +),
(Co 2 + , Tm 1 +),	(Ni 3 + , Rb 2 +),	(Zn 2 + , Ho 2 +),
(Co 2 + , Yb 1 +),	(Ni 3 , Mo 3 +),	(Zn 2 + , Er 2 +),
(Co 2 + , Lu 1 +),	(Cu 5 + , Ni 5 +),	(Zn 2 + , Tm 2 +),
(Co 2 + , Tl 1 +),	(Ni 4 + , Br 4 +),	(Zn 2 + , Yb 2 +),
(Co 2 + , Ra 1 +),	(Br 6 + , Ni 5 +),	(Zn 3 + , Rh 3 +),

a5

151

(Co 2 + , Ac 1 +),	(Nb 5 + , Ni 5 +),	(Zn 3 + , Xe 3 +),
(Co 2 + , Th 1 +),	(Ni 5 + , Cu 5 +),	(Zn 3 + , Pb 3 +),
(Co 2 + , Pa 1 +),	(Rb 7 + , Ni 6 +),	(Kr 6 + , Zn 5 +),
(Co 2 + , U 1 +),	(Ni 7 + , Zn 7 +),	(Rb 7 + , Zn 6 +),
(Co 2 + , Np 1 +),	(Br 2 + , Cu 1 +),	(Zn 6 + , Sr 7 +),
(Co 2 + , Pu 1 +),	(Ag 2 + , Cu 1 +),	(Ge 2 + , Ga 1 +),
(Co 2 + , Am 1 +),	(Br 3 + , Cu 2 +),	(Zr 3 + , Ga 1 +),
(Co 2 + , Cm 1 +),	(Cu 2 + , Zn 1 +),	(I 2 + , Ga 1 +),
(Co 2 + , Bk 1 +),	(Ga 3 + , Cu 3 +),	(Hf 3 + , Ga 1 +),
(Co 2 + , Cf 1 +),	(Cu 2 + , As 1 +),	(Hg 2 + , Ga 1 +),
(Co 2 + , Es 1 +),	(Cu 2 + , Se 1 +),	(Te 4 + , Ga 3 +),
(Co 4 + , Co 4 +),	(Kr 4 + , Cu 3 +),	(Ga 3 + , Br 3 +),
(Kr 5 + , Co 4 +),	(Cu 2 + , Pd 1 +),	(Ga 3 + , Kr 3 +),
(Co 3 + , Zr 3 +),	(Cu 2 + , Cd 1 +),	(Ga 3 + , Ce 4 +),
(Co 3 + , Sm 3 +),	(Cu 2 + , Sb 1 +),	(Br 2 + , Ge 1 +),
(Co 3 + , Ho 3 +),	(Cu 2 + , Te 1 +),	(Se 3 + , Ge 2 +),
(Co 3 + , Tm 3 +),	(Cu 2 + , Os 1 +),	(Sr 2 + , Ge 2 +),
(Co 3 + , Hf 3 +),	(Cu 2 + , Ir 1 +),	(Sb 3 + , Ge 2 +),
(Co 4 + , Co 4 +),	(Cu 2 + , Pt 1 +),	(Gd 3 + , Ge 2 +),
(Co 7 + , Co 7 +),	(Cu 2 + , Au 1 +),	(Yb 3 + , Ge 2 +),
(Co 7 + , Co 7 +),	(Cu 2 + , Po 1 +),	(Ge 2 + , Y 1 +),
(Y 3 + , Ge 3 +),	(Te 4 + , Se 3 +),	(Kr 3 + , Eu 3 +),
(Ge 2 + , Zr 1 +),	(Rb 4 + , Se 4 +),	(Kr 3 + , Yb 3 +),
(Ge 2 + , Nb 1 +),	(Se 3 + , Tc 2 +),	(Kr 4 + , Kr 3 +),
(Ge 2 + , Mo 1 +),	(Se 3 + , Sn 2 +),	(Y 5 + , Kr 5 +),
(Ge 2 + , In 1 +),	(Te 5 + , Se 4 +),	(Kr 4 + , Cd 3 +),
(Ge 2 + , Gd 1 +),	(Se 3 + , Hf 2 +),	(Kr 4 + , Te 4 +),
(Ge 2 + , Tb 1 +),	(Se 3 + , Pb 2 +),	(Kr 4 + , Ce 4 +),
(Ge 2 + , Dy 1 +),	(Se 4 + , Rb 3 +),	(Sr 6 + , Kr 6 +),
(Ge 2 + , Ho 1 +),	(Se 4 + , Sn 4 +),	(Kr 5 + , Nb 5 +),
(Ge 2 + , Er 1 +),	(Se 4 + , Nd 4 +),	(Xe 2 + , Rb 1 +),
(Ge 2 + , Tm 1 +),	(Se 4 + , Pm 4 +),	(Pb 2 + , Rb 1 +),
(Ge 2 + , Yb 1 +),	(Se 5 + , In 4 +),	(Rb 2 + , Y 2 +),
(Ge 2 + , Hf 1 +),	(Rb 2 + , Br 1 +),	(Mo 5 + , Rb 3 +),
(Ge 2 + , Tl 1 +),	(Pr 3 + , Br 1 +),	(Rb 2 + , Xe 1 +),
(Ge 2 + , Th 1 +),	(Tb 3 + , Br 1 +),	(Rb 2 + , Gd 2 +),
(Ge 2 + , Pa 1 +),	(La 3 + , Br 2 +),	(Rb 2 + , Tb 2 +),
(Ge 2 + , U 1 +),	(Br 2 + , Pd 1 +),	(Rb 2 + , Dy 2 +),
(Ge 2 + , Np 1 +),	(Br 2 + , Ag 1 +),	(Rb 2 + , Ho 2 +),
(Ge 2 + , Pu 1 +),	(Br 2 + , Cd 1 +),	(Rb 2 + , Er 2 +),
(Ge 2 + , Am 1 +),	(Br 2 + , Sb 1 +),	(Rb 2 + , Tm 2 +),
(Ge 2 + , Cm 1 +),	(Br 2 + , Ta 1 +),	(Rb 2 + , Yb 2 +),
(Ge 2 + , Bk 1 +),	(Br 2 + , W 1 +),	(Rb 3 + , Nb 3 +),
(Ge 2 + , Cf 1 +),	(Br 2 + , Re 1 +),	(Rb 3 + , Sb 3 +),
(Ge 2 + , Es 1 +),	(Br 2 + , Os 1 +),	(Rb 3 + , Cs 2 +),
(Ge 3 + , As 2 +),	(Br 2 + , Po 1 +),	(Rb 3 + , Eu 3 +),
(Ge 3 + , Rh 2 +),	(Br 3 + , Pd 2 +),	(Rb 3 + , Yb 3 +),
(Ge 3 + , Te 2 +),	(Br 3 + , In 2 +),	(Rb 3 + , Bi 3 +),
(Ge 3 + , Pt 2 +),	(Br 3 + , I 2 +),	(Rb 6 + , Rb 5 +),
(Kr 2 + , As 1 +),	(Br 3 + , La 3 +),	(Rb 4 + , Sr 3 +),

a5

152

(Nb 3 + , As 1 +), (Br 3 + , Ce 3 +), (Rb 4 + , Eu 4 +),
(Cd 2 + , As 1 +), (Br 4 + , Xe 3 +), (Rb 4 + , Er 4 +),
(Te 3 + , As 1 +), (Br 4 + , Pb 3 +), (Rb 4 + , Tm 4 +),
(Mo 3 + , As 2 +), (Y 6 + , Br 6 +), (Rb 4 + , Yb 4 +),
(Sb 4 + , As 3 +), (Br 5 + , Mo 5 +), (Rb 5 + , Sr 4 +),
(Bi 4 + , As 3 +), (Pm 3 + , Kr 1 +), (Rb 5 + , Sb 5 +),
(As 3 + , Br 2 +), (Sm 3 + , Kr 1 +), (Rb 5 + , Bi 5 +),
(Kr 5 + , As 4 +), (Dy 3 + , Kr 1 +), (Rb 6 + , Rb 5 +),
(As 3 + , Zr 3 +), (Pb 3 + , Kr 1 +), (Rb 6 + , Sr 5 +),
(As 3 + , Nd 3 +), (Kr 3 + , Kr 2 +), (Mo 6 + , Rb 7 +),
(As 3 + , Pm 3 +), (Rb 3 + , Kr 2 +), (Rb 7 + , Sb 6 +),
(As 3 + , Tb 3 +), (Kr 4 + , Kr 3 +), (Pd 2 + , Sr 1 +),
(As 3 + , Dy 3 +), (Kr 2 + , Cd 1 +), (I 2 + , Sr 1 +),
(As 3 + , Ho 3 +), (Kr 2 + , Sb 1 +), (Hf 3 + , Sr 1 +),
(As 3 + , Er 3 +), (Kr 2 + , Te 1 +), (Nb 3 + , Sr 2 +),
(As 4 + , Br 3 +), (Kr 2 + , Os 1 +), (Pr 3 + , Sr 2 +),
a5 (Sr 5 + , As 5 +), (Kr 2 + , Ir 1 +), (Sr 4 + , Sr 3 +),
(Se 6 + , As 6 +), (Kr 2 + , Pt 1 +), (Sr 2 + , Mo 2 +),
(As 5 + , Rb 7 +), (Kr 2 + , Au 1 +), (Sr 2 + , Tc 2 +),
(Kr 2 + , Se 1 +), (Kr 3 + , Kr 2 +), (Sr 2 + , Sb 2 +),
(Cd 2 + , Se 1 +), (Kr 3 + , Nb 3 +), (Te 5 + , Sr 3 +),
(Te 3 + , Se 1 +), (Kr 3 + , Sb 3 +), (Sr 3 + , Tc 3 +),
(Ce 3 + , Se 1 +), (Kr 3 + , Cs 2 +), (Sr 3 + , Tl 3 +),
(Sr 4 + , Sr 3 +), (Eu 3 + , Nb 2 +), (Ag 2 + , Ru 1 +),
(Sr 4 + , Sb 4 +), (Dy 3 + , Nb 2 +), (Sb 3 + , Ru 2 +),
(Sr 4 + , Gd 4 +), (Ho 3 + , Nb 2 +), (Gd 3 + , Ru 2 +),
(Sr 4 + , Yb 4 +), (Er 3 + , Nb 2 +), (Lu 3 + , Ru 2 +),
(Zr 3 + , Y 1 +), (Tm 3 + , Nb 2 +), (Sb 4 + , Ru 3 +),
(Ag 2 + , Y 1 +), (Pb 3 + , Nb 2 +), (Bi 4 + , Ru 3 +),
(Hg 2 + , Y 1 +), (Nb 3 + , I 1 +), (Ag 2 + , Rh 1 +),
(Sn 3 + , Y 2 +), (Nb 3 + , Ba 2 +), (Lu 3 + , Rh 2 +),
(Nd 3 + , Y 2 +), (Nb 3 + , La 2 +), (Bi 3 + , Rh 2 +),
(Tb 3 + , Y 2 +), (Nb 3 + , Ce 2 +), (Te 4 + , Rh 3 +),
(Y 3 + , Zr 4 +), (Nb 3 + , Pr 2 +), (Rh 2 + , Cs 1 +),
(Y 3 + , Hf 4 +), (Nb 3 + , Nd 2 +), (Ce 3 + , Pd 1 +),
(Y 3 + , Hg 3 +), (Nb 3 + , Pm 2 +), (Pd 2 + , In 1 +),
(Y 4 + , La 4 +), (Nb 3 + , Sm 2 +), (Pd 2 + , Ba 1 +),
(Y 6 + , Bi 6 +), (Nb 3 + , Eu 2 +), (Pd 2 + , La 1 +),
(Zr 3 + , Zr 1 +), (Nb 3 + , Hg 1 +), (Pd 2 + , Ce 1 +),
(Ag 2 + , Zr 1 +), (Nb 3 + , Rn 1 +), (Pd 2 + , Pr 1 +),
(Hg 2 + , Zr 1 +), (Nb 3 + , Ra 2 +), (Pd 2 + , Nd 1 +),
(Sn 3 + , Zr 2 +), (Nb 4 + , Nd 3 +), (Pd 2 + , Pm 1 +),
(Nd 3 + , Zr 2 +), (Nb 4 + , Pm 3 +), (Pd 2 + , Sm 1 +),
(Pm 3 + , Zr 2 +), (Nb 4 + , Sm 3 +), (Pd 2 + , Eu 1 +),
(Sm 3 + , Zr 2 +), (Nb 4 + , Dy 3 +), (Pd 2 + , Tb 1 +),
(Dy 3 + , Zr 2 +), (Nb 4 + , Ho 3 +), (Pd 2 + , Dy 1 +),
(Nb 4 + , Zr 3 +), (Nb 4 + , Er 3 +), (Pd 2 + , Lu 1 +),
(Zr 3 + , Zr 1 +), (Nb 4 + , Hf 3 +), (Pd 2 + , Ra 1 +),
(Zr 3 + , Nb 1 +), (Mo 7 + , Nb 7 +), (Pd 2 + , Ac 1 +),
(Zr 3 + , Mo 1 +), (Ag 2 + , Mo 1 +), (Pd 2 + , Pa 1 +),

153

(Zr 3 + , Tc 1 +),	(Hg 2 + , Mo 1 +),	(Ag 2 + , Ag 1 +),
(Zr 3 + , Gd 1 +),	(Sb 3 + , Mo 2 +),	(La 3 + , Ag 2 +),
(Zr 3 + , Tb 1 +),	(Gd 3 + , Mo 2 +),	(Ag 2 + , Ag 1 +),
(Zr 3 + , Dy 1 +),	(Yb 3 + , Mo 2 +),	(Ag 2 + , Sn 1 +),
(Zr 3 + , Ho 1 +),	(Mo 3 + , Rh 2 +),	(Ag 2 + , Hf 1 +),
(Zr 3 + , Er 1 +),	(Mo 3 + , In 2 +),	(Ag 2 + , Pb 1 +),
(Zr 3 + , Tm 1 +),	(Mo 3 + , Te 2 +),	(Ag 2 + , Bi 1 +),
(Zr 3 + , Yb 1 +),	(Mo 3 + , I 2 +),	(Ag 2 + , Es 1 +),
(Zr 3 + , Hf 1 +),	(Mo 3 + , La 3 +),	(Cd 2 + , Cd 1 +),
(Zr 3 + , Tl 1 +),	(Mo 3 + , Pt 2 +),	(Te 3 + , Cd 1 +),
(Zr 3 + , Bi 1 +),	(Mo 3 + , Hg 2 +),	(Ce 3 + , Cd 1 +),
(Zr 3 + , Th 1 +),	(Mo 4 + , Pd 3 +),	(Sb 3 + , Cd 2 +),
(Zr 3 + , Pa 1 +),	(Mo 4 + , I 3 +),	(Gd 3 + , Cd 2 +),
(Zr 3 + , U 1 +),	(Mo 4 + , Hf 4 +),	(Lu 3 + , Cd 2 +),
(Zr 3 + , Np 1 +),	(Bi 5 + , Mo 5 +),	(Bi 3 + , Cd 2 +),
(Zr 3 + , Pu 1 +),	(Mo 5 + , Sn 4 +),	(Cd 2 + , Cd 1 +),
(Zr 3 + , Am 1 +),	(Mo 5 + , Nd 4 +),	(Cd 2 + , Te 1 +),
(Zr 3 + , Cm 1 +),	(Mo 5 + , Tb 4 +),	(Cd 2 + , I 1 +),
(Zr 3 + , Bk 1 +),	(Ag 2 + , Tc 1 +),	(Cd 2 + , Ba 2 +),
(Zr 3 + , Cf 1 +),	(Eu 3 + , Tc 2 +),	(Cd 2 + , Ir 1 +),
(Zr 3 + , Es 1 +),	(Ho 3 + , Tc 2 +),	(Cd 2 + , Pt 1 +),
(Zr 4 + , In 4 +),	(Er 3 + , Tc 2 +),	(Cd 2 + , Au 1 +),
(Ag 2 + , Nb 1 +),	(Tm 3 + , Tc 2 +),	(Cd 2 + , Hg 1 +),
(Hg 2 + , Nb 1 +),	(Yb 3 + , Tc 2 +),	(Cd 2 + , Ra 2 +),
(Sm 3 + , Nb 2 +),	(Pb 3 + , Tc 2 +),	(I 2 + , In 1 +),
(Hf 3 + , In 1 +),	(Tb 3 + , Xe 1 +),	(Hg 2 + , Tb 1 +),
(Hg 2 + , In 1 +),	(Xe 2 + , Cs 1 +),	(Tb 3 + , Tb 2 +),
(Sb 4 + , In 3 +),	(Pb 2 + , Cs 1 +),	(Tb 3 + , Tb 2 +),
(Bi 4 + , In 3 +),	(Hf 3 + , Ba 1 +),	(Tb 3 + , Dy 2 +),
(In 3 + , Bi 3 +),	(Hf 3 + , La 1 +),	(Tb 3 + , Ho 2 +),
(Eu 3 + , Sn 2 +),	(Pr 3 + , La 2 +),	(Tb 3 + , Er 2 +),
(Ho 3 + , Sn 2 +),	(La 3 + , Pr 3 +),	(Tb 3 + , Tm 2 +),
(Er 3 + , Sn 2 +),	(La 3 + , Nd 3 +),	(Tb 3 + , Yb 2 +),
(Tm 3 + , Sn 2 +),	(La 3 + , Pm 3 +),	(Hf 3 + , Dy 1 +),
(Pb 3 + , Sn 2 +),	(La 3 + , Tb 3 +),	(Hg 2 + , Dy 1 +),
(Te 4 + , Sn 3 +),	(La 3 + , Dy 3 +),	(Dy 3 + , Lu 2 +),
(Pb 4 + , Sn 4 +),	(La 3 + , Ho 3 +),	(Pb 4 + , Dy 4 +),
(Sn 4 + , Sb 4 +),	(La 3 + , Er 3 +),	(Hf 3 + , Ho 1 +),
(Sn 4 + , Gd 4 +),	(Hf 3 + , Ce 1 +),	(Hg 2 + , Ho 1 +),
(Sn 4 + , Lu 4 +),	(Pr 3 + , Ce 2 +),	(Ho 3 + , Hf 2 +),
(Ce 3 + , Sb 1 +),	(Ce 3 + , Os 1 +),	(Ho 3 + , Pb 2 +),
(Sb 3 + , Sb 2 +),	(Ce 3 + , Ir 1 +),	(Hf 3 + , Er 1 +),
(Gd 3 + , Sb 2 +),	(Ce 3 + , Pt 1 +),	(Hg 2 + , Er 1 +),
(Yb 3 + , Sb 2 +),	(Ce 3 + , Au 1 +),	(Er 3 + , Hf 2 +),
(Sb 3 + , Sb 2 +),	(Ce 3 + , Po 1 +),	(Er 3 + , Pb 2 +),
(Sb 3 + , Bi 2 +),	(Hf 3 + , Pr 1 +),	(Hf 3 + , Tm 1 +),
(Sb 4 + , Te 3 +),	(Pr 3 + , Pr 2 +),	(Hg 2 + , Tm 1 +),
(Te 3 + , Te 1 +),	(Pr 3 + , Pr 2 +),	(Tm 3 + , Hf 2 +),
(Ce 3 + , Te 1 +),	(Pr 3 + , Nd 2 +),	(Tm 3 + , Pb 2 +),
(Bi 4 + , Te 3 +),	(Pr 3 + , Pm 2 +),	(Hf 3 + , Yb 1 +),

a5

154

95

(Te 3+ , Te 1+),	(Pr 3+ , Sm 2+),	(Hg 2+ , Yb 1+),
(Te 3+ , Ba 2+),	(Pr 3+ , Eu 2+),	(Yb 3+ , Bi 2+),
(Te 3+ , Ir 1+),	(Pr 3+ , Tb 2+),	(Hf 3+ , Lu 1+),
(Te 3+ , Pt 1+),	(Pr 3+ , Dy 2+),	(Pb 3+ , Lu 2+),
(Te 3+ , Au 1+),	(Pr 3+ , Ho 2+),	(Lu 3+ , Bi 2+),
(Te 3+ , Ra 2+),	(Pr 3+ , Er 2+),	(Hg 2+ , Hf 1+),
(Te 5+ , Eu 4+),	(Pr 3+ , Rn 1+),	(Pb 3+ , Hf 2+),
(Te 5+ , Ho 4+),	(Hf 3+ , Nd 1+),	(Hf 3+ , Tl 1+),
(Te 5+ , Er 4+),	(Nd 3+ , Gd 2+),	(Hf 3+ , Ra 1+),
(Te 5+ , Tm 4+),	(Nd 3+ , Er 2+),	(Hf 3+ , Ac 1+),
(Te 5+ , Pb 4+),	(Nd 3+ , Tm 2+),	(Hf 3+ , Th 1+),
(I 2+ , Ba 1+),	(Nd 3+ , Yb 2+),	(Hf 3+ , Pa 1+),
(I 2+ , La 1+),	(Pb 4+ , Nd 4+),	(Hf 3+ , U 1+),
(I 2+ , Ce 1+),	(Hf 3+ , Pm 1+),	(Hf 3+ , Np 1+),
(I 2+ , Pr 1+),	(Pm 3+ , Lu 2+),	(Hf 3+ , Pu 1+),
(I 2+ , Nd 1+),	(Pb 4+ , Pm 4+),	(Hf 3+ , Am 1+),
(I 2+ , Pm 1+),	(Hf 3+ , Sm 1+),	(Hf 3+ , Cm 1+),
(I 2+ , Sm 1+),	(Sm 3+ , Lu 2+),	(Hf 3+ , Bk 1+),
(I 2+ , Eu 1+),	(Pb 4+ , Sm 4+),	(Hf 3+ , Cf 1+),
(I 2+ , Tb 1+),	(Hf 3+ , Eu 1+),	(Hg 2+ , Tl 1+),
(I 2+ , Dy 1+),	(Eu 3+ , Hf 2+),	(Hg 2+ , Th 1+),
(I 2+ , Lu 1+),	(Eu 3+ , Pb 2+),	(Hg 2+ , Pa 1+),
(I 2+ , Ra 1+),	(Hf 3+ , Gd 1+),	(Hg 2+ , U 1+),
(I 2+ , Ac 1+),	(Hg 2+ , Gd 1+),	(Hg 2+ , Np 1+),
(I 2+ , Pa 1+),	(Tb 3+ , Gd 2+),	(Hg 2+ , Pu 1+),
(I 2+ , Am 1+),	(Gd 3+ , Bi 2+),	(Hg 2+ , Am 1+),
(Nd 3+ , Xe 1+),	(Hf 3+ , Tb 1+),	(Hg 2+ , Cm 1+),
(Hg 2+ , Bk 1+),	(Hg 2+ , Cf 1+),	(Hg 2+ , Es 1+),
(Pb 3+ , Pb 2+),	(Pb 3+ , Pb 2+),	(K 1+ , Cl),
(As 2+ , H),	(K 1+ , F),	(Cr 2+ , Cl),
(Ru 2+ , H),	(Cr 2+ , F),	(Fe 2+ , Cl),
(In 2+ , H),	(Fe 2 , F),	(As 2+ , K),
(Te 2+ , H),	(As 2+ , Na),	(Ru 2+ , K),
(Al 2+ , H),	(Ru 2+ , Na),	(In 2+ , K),
(Ar 1+ , H),	(In 2+ , Na),	(Te 2+ , K),
(As 2+ , Li),	(Te 2+ , Na),	(Al 2+ , K),
(Ru 2+ , Li),	(Al 2+ , Na),	(Ar 1+ , K),
(In 2+ , Li),	(Ar 1+ , Na),	(As 2+ , Fe),
(Te 2+ , Li),	(Ti 2+ , Na),	(Ru 2+ , Fe),
(Al 2+ , Li),	(As 2+ , Al),	(In 2+ , Fe),
(Ar 1+ , Li),	(Ru 2+ , Al),	(Te 2+ , Fe),
(Ti 2+ , Li),	(In 2+ , Al),	(Al 2+ , Fe),
(As 2+ , B),	(Te 2+ , Al),	(Ar 1+ , Fe),
(Rb 1+ , B),	(Al 2+ , Al),	(Ti 2+ , Fe),
(Mo 2+ , B),	(Ar 1+ , Al),	(As 2+ , Co),
(Ru 2+ , B),	(Ti 2+ , Al),	(Ru 2+ , Co),
(In 2+ , B),	(As 2+ , Si),	(In 2+ , Co),
(Te 2+ , B),	(Tc 2+ , Si),	(Te 2+ , Co),
(Al 2+ , B),	(Ru 2+ , Si),	(Al 2+ , Co),
(Ar 1+ , B),	(Tl 2+ , Si),	(V 2+ , Co),

155

(Ti 2 + , B), (N 1 + , Si), (Tc 2 + , Cu),
(As 2 + , C), (Al 2 + , Si), (Tl 2 + , Cu),
(Tc 2 + , C), (V 2 + , Si), (N 1 + , Cu),
(Ru 2 + , C), (As 2 + , P), (P 2 + , Cu),
(In 2 + , C), (Ru 2 + , P), (V 2 + , Cu),
(Te 2 + , C), (In 2 + , P), (Ga 2 + , Br),
(N 1 + , C), (Te 2 + , P), (Se 2 + , Br),
(Al 2 + , C), (Al 2 + , P), (Rh 2 + , Br),
(V 2 + , C), (Ar 1 + , P), (Sn 2 + , Br),
(As 2 + , O), (Tc 2 + , S), (P 2 + , Br),
(Tc 2 + , O), (Sn 2 + , S), (K 1 + , Br),
(Ru 2 + , O), (Tl 2 + , S), (Cr 2 + , Br),
(Tl 2 + , O), (N 1 + , S), (Fe 2 + , Br),
(N 1 + , O), (P 2 + , S), (As 2 + , Rb),
(Al 2 + , O), (V 2 + , S), (Rb 1 + , Rb),
(V 2 + , O), (Ga 2 + , Cl), (Mo 2 + , Rb),
(Ga 2 + , F), (Se 2 + , Cl), (Ru 2 + , Rb),
(Se 2 + , F), (Rh 2 + , Cl), (In 2 + , Rb),
(Rh 2 + , F), (Sn 2 + , Cl), (Te 2 + , Rb),
(Sn 2 + , F), (Xe 2 + , Cl), (Al 2 + , Rb),
(Pb 2 + , F), (Pb 2 + , Cl), (Ru 2 + , Pb),
(Ar 1 + , Rb), (P 2 + , Tl), (In 2 + , Pb),
(Ti 2 + , Rb), (V 2 + , Tl), (Te 2 + , Pb),
(Ga 2 + , I), (Tc 2 + , Au), (Al 2 + , Pb),
(Se 2 + , I), (Sn 2 + , Au), (V 2 + , Pb),
(Rh 2 + , I), (Tl 2 + , Au), (Tc 2 + , Po),
(Sn 2 + , I), (N 1 + , Au), (Tl 2 + , Po),
(P 2 + , I), (P 2 + , Au), (N 1 + , Po),
(Cr 2 + , I), (V 2 + , Au), (P 2 + , Po),
(Fe 2 + , I), (As 2 + , Hg), (V 2 + , Po),
(As 2 + , Cs), (Tc 2 + , Hg), (Ga 2 + , At),
(Rb 1 + , Cs), (Ru 2 + , Hg), (Se 2 + , At),
(Mo 2 + , Cs), (Tl 2 + , Hg), (Rh 2 + , At),
(Ru 2 + , Cs), (N 1 + , Hg), (Sn 2 + , At),
(In 2 + , Cs), (Al 2 + , Hg), (Tl 2 + , At),
(Te 2 + , Cs), (V 2 + , Hg), (N 1 + , At),
(Al 2 + , Cs), (As 2 + , As), (P 2 + , At),
(Ar 1 + , Cs), (Ru 2 + , As), (Cr 2 + , At),
(Ti 2 + , Cs), (In 2 + , As), (Fe 2 + , At),
(Tc 2 + , Se), (Te 2 + , As), (As 2 + , Ge),
(Tl 2 + , Se), (Al 2 + , As), (Tc 2 + , Ge),
(N 1 + , Se), (Ar 1 + , As), (Ru 2 + , Ge),
(P 2 + , Se), (Ti 2 + , As), (In 2 + , Ge),
(V 2 + , Se), (As 2 + , Ce), (N 1 + , Ge),
(Tc 2 + , Te), (Tc 2 + , Ce), (Al 2 + , Ge),
(Sn 2 + , Te), (Ru 2 + , Ce), (V 2 + , Ge),
(Tl 2 + , Te), (In 2 + , Ce), (As 2 + , Ga),
(N 1 + , Te), (N 1 + , Ce), (Rb 1 + , Ga),
(P 2 + , Te), (Al 2 + , Ce), (Ru 2 + , Ga),
(V 2 + , Te), (V 2 + , Ce), (In 2 + , Ga),

154

(Fe 2 + , Te),	(As 2 + , Fr),	(Te 2 + , Ga),
(As 2 + , As),	(Rb 1 + , Fr),	(Al 2 + , Ga),
(Ru 2 + , As),	(Ru 2 + , Fr),	(Ar 1 + , Ga),
(In 2 + , As),	(In 2 + , Fr),	(Ti 2 + , Ga),
(Te 2 + , As),	(Te 2 + , Fr),	(As 2 + , In),
(Al 2 + , As),	(Al 2 + , Fr),	(Rb 1 + , In),
(Ar 1 + , As),	(Ar 1 + , Fr),	(Mo 2 + , In),
(Ti 2 + , As),	(Ti 2 + , Fr),	(Ru 2 + , In),
(Tc 2 + , Sb),	(As 2 + , Ge),	(In 2 + , In),
(Tl 2 + , Sb),	(Tc 2 + , Ge),	(Te 2 + , In),
(N 1 + , Sb),	(Ru 2 + , Ge),	(Al 2 + , In),
(P 2 + , Sb),	(In 2 + , Ge),	(Ar 1 + , In),
(V 2 + , Sb),	(N 1 + , Ge),	(Ti 2 + , In),
(As 2 + , Bi),	(Al 2 + , Ge),	(As 2 + , Ag),
(Ru 2 + , Bi),	(V 2 + , Ge),	(Tc 2 + , Ag),
(In 2 + , Bi),	(As 2 + , Sn),	(Ru 2 + , Ag),
(Te 2 + , Bi),	(Tc 2 + , Sn),	(N 1 + , Ag),
(Al 2 + , Bi),	(Ru 2 + , Sn),	(Al 2 + , Ag),
(Ar 1 + , Bi),	(N 1 + , Sn),	(V 2 + , Ag),
(Tc 2 + , Tl),	(Al 2 + , Sn),	(P 2 + , OH),
(Sn 2 + , Tl),	(V 2 + , Sn),	(V 2 + , OH),
(Tl 2 + , Tl),	(As 2 + , Pb),	(Tc 2 + , SH),
(N 1 + , Tl),	(Tc 2 + , Pb),	(Sn 2 + , SH),
(Ga 2 + , BF3),	(Rh 2 + , UF6),	(Tl 2 + , SH),
(Se 2 + , BF3),	(Sn 2 + , UF6),	(N 1 + , SH),
(Tc 2 + , BF3),	(Tl 2 + , UF6),	(P 2 + , SH),
(Rh 2 + , BF3),	(P 2 + , UF6),	(V 2 + , SH),
(Sn 2 + , BF3),	(Cr 2 + , UF6),	(Fe 2 + , SH),
(Tl 2 + , BF3),	(Fe 2 + , UF6),	(Ga 2 + , CN),
(N 1 + , BF3),	(Tc 2 + , CF3),	(Se 2 + , CN),
(P 2 + , BF3),	(Tl 2 + , CF3),	(Rh 2 + , CN),
(Cr 2 + , BF3),	(N 1 + , CF3),	(Sn 2 + , CN),
(Fe 2 + , BF3),	(P 2 + , CF3),	(P 2 + , CN),
(Se 2 + , NO2),	(V 2 + , CF3),	(K 1 + , CN),
(Rh 2 + , NO2),	(As 2 + , CCl3),	(Cr 2 + , CN),
(Xe 2 + , NO2),	(Tc 2 + , CCl3),	(Fe 2 + , CN),
(Pb 2 + , NO2),	(Ru 2 + , CCl3),	(Tc 2 + , SCN),
(K 1 + , NO2),	(In 2 + , CCl3),	(Sn 2 + , SCN),
(Cr 2 + , NO2),	(N 1 + , CCl3),	(Tl 2 + , SCN),
(As 2 + , O2),	(Al 2 + , CCl3),	(N 1 + , SCN),
(Rb 1 + , O2),	(V 2 + , CCl3),	(P 2 + , SCN),
(Ru 2 + , O2),	(Ga 2 + , SiF3),	(V 2 + , SCN),
(In 2 + , O2),	(Se 2 + , SiF3),	(Fe 2 + , SCN),
(Te 2 + , O2),	(Rh 2 + , SiF3),	(Ga 2 + , SeCN),
(Al 2 + , O2),	(Sn 2 + , SiF3),	(Se 2 + , SeCN),
(Ar 1 + , O2),	(P 2 + , SiF3),	(Tc 2 + , SeCN),
(Ti 2 + , O2),	(K 1 + , SiF3),	(Rh 2 + , SeCN),
(As 2 + , SF6),	(Cr 2 + , SiF3),	(Sn 2 + , SeCN),
(Tc 2 + , SF6),	(Fe 2 + , SiF3),	(Tl 2 + , SeCN),
(Ru 2 + , SF6),	(As 2 + , NH2),	(N 1 + , SeCN),

a5

157

(Tl 2 + , SF6),	(Tc 2 + , NH2),	(P 2 + , SeCN),
(N 1 + , SF6),	(Ru 2 + , NH2),	(Cr 2 + , SeCN),
(Al 2 + , SF6),	(In 2 + , NH2),	(Fe 2 + , SeCN),
(V 2 + , SF6),	(Te 2 + , NH2),	(Tl 2 + , PH 2),
(Ga 2 + , WF6),	(N 1 + , NH2),	(N 1 + , PH 2),
(Se 2 + , WF6),	(Al 2 + , NH2),	(Al 2 + , PH 2),
(Tc 2 + , WF6),	(V 2 + , NH2),	(V 2 + , PH 2),
(Rh 2 + , WF6),	(Tc 2 + , PH 2),	(Tc 2 + , OH),
(Sn 2 + , WF6),	(Ru 2 + , PH 2),	(Tl 2 + , OH),
(Tl 2 + , WF6),	(Fe 2 + , WF6),	(N 1 + , OH),
(N 1 + , WF6),	(Ga 2 + , UF6),	(Cr 2 + , WF6),and
	(Se 2 + , UF6),	(P 2 + , WF6).

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112. An explosive material comprising:

    a source of at least one hydrino hydride ion; and

    a source of protons.

113. An explosive material according to claim 112, wherein said source of said protons comprises an acid.

114. An explosive material according to claim 113, wherein said acid is a super-acid.

115. An explosive material according to claim 113, wherein said acid is selected from the group consisting of HF, HCl, H_2SO_4, HNO_3, the reaction products of HF and SbF_5, the reaction products of HCl and Al_2Cl_6, the reaction products of H_2SO_3F and SbF_5, the reaction products of H_2SO_4 and SO_2, and combinations thereof.

116. An explosive material according to claim 112, wherein said source of protons comprises H^1.

117. An explosive material according to claim 112, wherein said source of protons comprises H^2.

158

118. An explosive material according to claim 112, wherein said source of protons comprises H^3.

119. An explosive material according to claim 112, wherein said source of hydride ion comprises at least one compound comprising a hydrino hydride ion and at least one other element.

120. An explosive material according to claim 119, wherein said compound comprises at least one hydrino atom having a binding energy of about $13.6/n^2$ eV, wherein n is a fraction whose numerator is 1 and denominator is an integer greater than 1 and at least one other element.

121. An explosive material according to claim 119, wherein said compound comprises at least one dihydrino molecule having a first binding energy of about $15.5/n^2$ eV, wherein n is a fraction whose numerator is 1 and denominator is an integer greater than 1 and at least one other element.

122. An explosive material according to claim 119, wherein said compound comprises at least one dihydrino molecular ion having a first binding energy of about $16.4/n^2$ eV, wherein n is a fraction whose numerator is 1 and denominator is an integer greater than 1, and at least one other element.

123. An explosive material according to claim 119, wherein said compound comprises a hydrino hydride ion having a binding energy of about 0.65 eV and at least one other element.

124. An explosive material according to claim 119, wherein the compound further comprises one or more selected from the group consisting of ordinary hydrogen molecules, ordinary hydride ions, ordinary hydrogen atoms, protons, ordinary

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hydrogen molecular ions, and ordinary H^{3+}ions; and said method further comprises decomposing said compound to provide said hydrino hydride ion and protons.

125. An explosive material according to claim 119, wherein the compound has a formula selected from the group of formulae consisting of MH, MH_2, and M_2H_2 wherein M is an alkali cation and H is selected from the group consisting of increased binding energy hydride ions, hydrino atoms and dihydrino molecules.

126. An explosive material according to claim 119, wherein the compound has the formula MH_n wherein n is 1 or 2, M is an alkaline earth cation and H is selected from the group consisting of hydrino hydride ions and hydrino atoms.

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127. An explosive material according to claim 119, wherein the compound has the formula MHX wherein M is an alkali cation, X is one of a neutral atom, a molecule, or a singly negatively charged anion, and H is elected from the group consisting of hydrino hydride ions and hydrino atoms.

128. An explosive material according to claim 127, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

129. An explosive material according to claim 119, wherein the compound has the formula MHX wherein M is an alkaline earth cation, X is a singly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms.

130. An explosive material according to claim 129, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

160

131. An explosive material according to claim 119, wherein the compound has the formula MHX wherein M is an alkaline earth cation, X is a doubly negatively charged anion, and H is a hydrino atom.

132. An explosive material according to claim 131, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

133. An explosive material according to claim 119, wherein the compound has the formula M_2HX wherein M is an alkali cation, X is a singly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms.

134. An explosive material according to claim 133, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

135. An explosive material according to claim 119, wherein the compound has the formula MH_n wherein n is an integer from 1 to 5, M is an alkali cation and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

136. An explosive material according to claim 119, wherein the compound has the formula M_2H_n wherein n is an integer from 1 to 4, M is an alkaline earth cation and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

137. An explosive material according to claim 119, wherein the compound has the

161

formula M_2XH_n wherein n is an integer from 1 to 3, M is an alkaline earth cation, X is a singly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

138. An explosive material according to claim 137, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

139. An explosive material according to claim 119, wherein the compound has the formula $M_2X_2H_n$ wherein n is 1 or 2, M is an alkaline earth cation, X is a singly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

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140. An explosive material according to claim 139, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

141. An explosive material according to claim 119, wherein the compound has the formula M_2X_3H wherein M is an alkaline earth cation, X is a singly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms.

142. An explosive material according to claim 141, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

143. An explosive material according to claim 119, wherein the compound has the formula M_2XH_n wherein n is 1 or 2, M is an alkaline earth cation, X is a doubly negatively charged anion, and the hydrogen content H_n comprises at least one

162

increased binding energy hydrogen species.

144. An explosive material according to claim 143, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

145. An explosive material according to claim 119, wherein the compound has the formula $M_2XX'H$ wherein M is an alkaline earth cation, X is a singly negatively charged anion, X' is a doubly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms.

65

146. An explosive material according to claim 145, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

147. An explosive material according to claim 145, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

148. An explosive material according to claim 119, wherein the compound has the formula $MM'H_n$ wherein n is and integer from 1 to 3, M is an alkaline earth cation, M' is an alkali metal cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

149. An explosive material according to claim 119, wherein the compound is $MM'XH_n$ wherein n is 1 to 2, M is an alkaline earth cation, M' is an alkali metal cation, X is a singly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

163

150. An explosive material according to claim 149, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

151. An explosive material according to claim 119, wherein the compound is MM'XH where M is an alkaline earth cation, M' is an alkali metal cation, X is a doubly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms.

152. An explosive material according to claim 151, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

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153. An explosive material according to claim 119, wherein the compound has the formula MM'XX'H where M is an alkaline earth cation, M' is an alkali metal cation, X and X' are each a singly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms.

154. An explosive material according to claim 153, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

155. An explosive material according to claim 119, wherein the compound has the formula H_nS wherein n is 1 or 2, and the hydrogen content of H_n comprises at least one increased binding energy hydrogen species.

156. An explosive material according to claim 119, wherein the compound has the formula $MSiH_n$ wherein n is an integer from 1 to 6, M is an alkali or alkaline earth cation, and the hydrogen content of H_n comprises at least one increased binding

164

energy hydrogen species.

157. An explosive material according to claim 119, wherein the compound has the formula $MXM'H_n$ wherein n is an integer from 1 to 5;

M is an alkali or alkaline earth cation;

X is a singly negatively charged anion or a doubly negatively charged anion;

M' is selected from the group consisting of Si, Al, Ni, the transition elements, the inner transition elements, and the rare earth elements; and

the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

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158. An explosive material according to claim 157, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

159. An explosive material according to claim 157, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

160. An explosive material according to claim 119, wherein the compound has the formula $MAlH_n$ wherein n is an integer from 1 to 6, M is an alkali or alkaline earth cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

161. An explosive material according to claim 119, wherein the compound has the formula MH_n wherein:

n is an integer from 1 to 6;

M is selected from the group consisting of the transition elements, the inner transition elements, and the rare earth element cations and nickel; and

\165

the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

162. An explosive material according to claim 119, wherein the compound has the formula $MNiH_n$ wherein:

n is an integer from 1 to 6;

M is selected from the group consisting of alkali cations, alkaline earth cations, silicon, and aluminum; and

the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

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163. An explosive material according to claim 119, wherein the compound has the formula $MM'H_n$ wherein:

n is an integer from 1 to 6;

M is selected from the group consisting of alkali cations, alkaline earth cations, silicon, and aluminum;

M' is selected from the group consisting of the transition elements, the inner transition elements, and rare earth element cations; and

the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

164. An explosive material according to claim 119, wherein the compound has the formula M_2SiH_n wherein n is an integer from 1 to 8, M is an alkali or alkaline earth cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

165. An explosive material according to claim 119, wherein the compound has the formula Si_2H_n wherein n is an integer from 1 to 8, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

162

166. An explosive material according to claim 119, wherein the compound has the formula SiH_n wherein n is an integer from 1 to 8, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

167. An explosive material according to claim 119, wherein the compound has the formula TiH_n wherein n is an integer from 1 to 4, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

168. An explosive material according to claim 119, wherein the compound has the formula Al_2H_n wherein n is an integer from 1 to 4 and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

169. An explosive material according to claim 119, wherein the compound has the formula $MXAlX'H_n$ wherein n is 1 or 2, M is an alkali or alkaline earth cation, X and X' are each either a singly negatively charged anion or a doubly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

170. An explosive material according to claim 169, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

171. An explosive material according to claim 169, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

172. An explosive material according to claim 119, wherein the compound has the formula $MXSiX'H_n$ wherein n is 1 or 2, M is an alkali or alkaline earth cation, X and

265

167

X' are each either a singly negatively charged anion or a doubly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

173. An explosive material according to claim 172, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

174. An explosive material according to claim 172, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

65

175. An explosive material according to claim 119, wherein the compound has the formula SiO_2H_n wherein n is an integer from 1 to 6 and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

176. An explosive material according to claim 119, wherein the compound has the formula $MSiO_2H_n$ wherein n is an integer from 1 to 6, M is an alkali or alkaline earth cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

177. An explosive material according to claim 119, wherein the compound has the formula MSi_2H_n wherein n is an integer from 1 to 6, M is an alkali or alkaline earth cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

178. An explosive material according to claim 119, wherein the compound has the formula M_2SiH_n wherein n is an integer from 1 to 8, M is an alkali or alkaline earth cation, and the hydrogen content H_n comprises at least one increased binding

163

energy hydrogen species.

179. An explosive material according to claim 119, wherein the compound is greater that 50 atomic percent pure.

180. An explosive material according to claim 119, wherein the compound is greater that 90 atomic percent pure.

Sub B1

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181. An explosive material according to claim 119, wherein said at least one other element comprises at least one selected from the group consisting of a proton, ordinary hydrogen atom, ordinary hydrogen ions, ordinary hydrogen molecules, ordinary hydrogen molecular ions and ordinary H_3^+ ion and said explosive material further comprises decomposing said compound.

182. An explosive material according to claim 119, wherein said at least one other element comprises at least one element selected from the group consisting of alkaline earth metals and alkali metals and said explosive material further comprises decomposing said compound.

183. An explosive material according to claim 182, wherein said element comprises lithium or lithium ion.

Sub B2

184. An explosive material according to claim 119, wherein said at least one other element comprises at least one element selected from the group consisting of organic compounds and said explosive material further comprises decomposing said compound.

185. An explosive material according to claim 119, wherein said at least one other element comprises at least one element selected from the group consisting of

169

semiconductors and said explosive material further comprises decomposing said compound.

Sub B2

186. An explosive material according to claim 119, wherein said compound comprising:

(a) at least one neutral, positive or negative increased binding energy hydrogen species having a binding energy:

(i) greater than the binding energy of the corresponding ordinary hydrogen species, or

(ii) greater than the binding energy of any hydrogen species for which the corresponding ordinary hydrogen species is unstable or is not observed because the ordinary hydrogen species' binding energy is less than thermal energies at ambient conditions, or is negative; and

(b) at least one other element, wherein said increased binding energy hydrogen species is selected from the group consisting of H_n, H_n^-, and H_n^+, where n is an integer of 1 to 8, and n is greater than 1 when H has a positive charge.

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187. An explosive material according to claim 186, wherein said increased binding energy hydrogen species is selected from the group consisting of (a) a hydride ion having a binding energy greater than the binding energy of the corresponding ordinary hydride ion for p = 2 up to 23 in which the binding energy is represented by

$$Binding\ Energy = \frac{\hbar^2\sqrt{s(s+1)}}{8\mu_e a_0^2\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^2} - \frac{\pi\mu_0 e^2\hbar^2}{m_e^2 a_0^3}\left(1+\frac{2^2}{\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^3}\right)$$

+T,1700

where p is an integer greater than 1, s = ½, ħ is Plank's constant bar, μ_0 is the

170

permeability of vacuum, m_e is the mass of the electron, μ_e is the reduced electron mass, a_0 is the Bohr radius, and e is the elementary charge; (b) hydrogen atom having a binding energy greater than about 13.6 eV; (c) hydrogen molecule having a first binding energy greater than about 15.5 eV; and (d) molecular hydrogen ion having a binding energy greater than about 16.4 eV.

188. An explosive material according to claim 186, wherein the increased binding energy hydrogen species comprises a hydride ion having a binding energy of about 3.0, 6.6, 11.2, 16.7, 22.8 29.3, 36.1, 42.8, 49.4, 55.5, 61.0, 65.6, 69.2, 71.53, 72.4, 71.54, 68.8, 64.0, 56.8, 47.1, 34.6, of 19.2.

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189. An explosive material according to claim 186, wherein said increased binding energy hydrogen species is a hydride ion having a binding energy greater than the binding energy of the corresponding ordinary hydride ion for p = 2 up to 23 in which the binding energy is represented by

$$Binding\ Energy = \frac{\hbar^2\sqrt{s(s+1)}}{8\mu_e a_0^2\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^2} - \frac{\pi\mu_0 e^2\hbar^2}{m_e^2 a_0^3}\left(1+\frac{2^2}{\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^3}\right)$$

+T, 1710

where p is an integer greater than 1, s = ½, ħ is Plank's constant bar, μ_0 is the permeability of vacuum, m_e is the mass of the electron, μ_e is the reduced electron mass, a_0 is the Bohr radius, and e is the elementary charge.

190. An explosive material according to claim 186, wherein said increased binding energy hydrogen species is selected from the group consisting of (a) a hydrino atom having a binding energy of about 13.6 eV/$(1/p)^2$, where p is an integer greater than 1; (b) a hydride ion having a binding energy represented by

171

+T, 172.0

$$Binding\ Energy = \frac{\hbar^2\sqrt{s(s+1)}}{8\mu_e a_0^2\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^2} - \frac{\pi\mu_0 e^2\hbar^2}{m_e^2 a_0^3}\left(1+\frac{2^2}{\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^3}\right)$$

where p is an integer greater than 1, s = ½, ħ is Plank's constant bar, μ_0 is the permeability of vacuum, m_e is the mass of the electron, μ_e is the reduced electron mass, a_0 is the Bohr radius, and *e* is the elementary charge; (c) a trihydrino molecular ion, H_3^+ (1/p), having a binding energy of about $22.6/(1/p)^2$ eV; (d) a dihydrino molecule having a binding energy of about $15.5/(1/p)^2$ eV; and (e) a dihydrino molecular ion with a binding energy of about $16.4/(1/p)^2$ eV.

191. An explosive material according to claim 190, wherein p is 2 to 200.

192. An explosive material according to claim 190, wherein p is 2 to 24.

193. An explosive material according to claim 190, wherein said increased binding energy hydrogen species is negative.

194. An explosive material according to claim 112, wherein said source of hydrino hydride ion comprises a source of 2 or more types of hydrino hydride ions.

195. An explosive device comprising:

a walled structure containing an explosive material, wherein said explosive material comprises a source of at least one hydrino hydride ion and a source of protons.

196. An explosive device according to claim 195, wherein said device comprises a bullet containing said explosive material.

172

197. An explosive device according to claim 195, further comprising a detonator.

198. An explosive device according to claim 197, wherein said detonator comprises an explosive.

199. An explosive device according to claim 195, wherein said source of said protons comprises an acid.

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200. An explosive device according to claim 199, wherein said acid is a super-acid.

201. An explosive device according to claim 199, wherein said acid is selected from the group consisting of HF, HCl, H_2SO_4, HNO_3, the reaction products of HF and SbF_5, the reaction products of HCl and Al_2Cl_6, the reaction products of H_2SO_3F and SbF_5, the reaction products of H_2SO_4 and SO_2, and combinations thereof.

202. An explosive device according to claim 195, wherein said source of protons comprises H^1.

203. An explosive device according to claim 195, wherein said source of protons comprises H^2.

204. An explosive device according to claim 195, wherein said source of protons comprises H^3.

205. An explosive device according to claim 195, wherein said source of hydride ion comprises at least one compound comprising a hydrino hydride ion and at least one other element.

173

206. An explosive device according to claim 205, wherein said compound comprises at least one hydrino atom having a binding energy of about $13.6/n^2$ eV, wherein n is a fraction whose numerator is 1 and denominator is an integer greater than 1 and at least one other element.

207. An explosive device according to claim 205, wherein said compound comprises at least one dihydrino molecule having a first binding energy of about $15.5/n^2$ eV, wherein n is a fraction whose numerator is 1 and denominator is an integer greater than 1 and at least one other element.

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208. An explosive device according to claim 205, wherein said compound comprises at least one dihydrino molecular ion having a first binding energy of about $16.4/n^2$ eV, wherein n is a fraction whose numerator is 1 and denominator is an integer greater than 1, and at least one other element.

209. An explosive device according to claim 205, wherein said compound comprises a hydrino hydride ion having a binding energy of about 0.65 eV and at least one other element.

Sub B3

~~210. An explosive device according to claim 205, wherein the compound further comprises one or more selected from the group consisting of ordinary hydrogen molecules, ordinary hydride ions, ordinary hydrogen atoms, protons, ordinary hydrogen molecular ions, and ordinary H^{3+}ions; and said method further comprises decomposing said compound to provide said hydrino hydride ion and protons.~~

211. An explosive device according to claim 205, wherein the compound has a formula selected from the group of formulae consisting of MH, MH_2, and M_2H_2 wherein M is an alkali cation and H is selected from the group consisting of hydrino hydride ions, hydrino atoms and dihydrino molecules.

174

212. An explosive device according to claim 205, wherein the compound has the formula MH_n wherein n is 1 or 2, M is an alkaline earth cation and H is selected from the group consisting of hydrino hydride ions and hydrino atoms.

213. An explosive device according to claim 205, wherein the compound has the formula MHX wherein M is an alkali cation, X is one of a neutral atom, a molecule, or a singly negatively charged anion, and H is elected from the group consisting of hydrino hydride ions and hydrino atoms.

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214. An explosive device according to claim 213, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

215. An explosive device according to claim 205, wherein the compound has the formula MHX wherein M is an alkaline earth cation, X is a singly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms.

216. An explosive device according to claim 215, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

217. An explosive device according to claim 205, wherein the compound has the formula MHX wherein M is an alkaline earth cation, X is a doubly negatively charged anion, and H is a hydrino atom.

218. An explosive device according to claim 217, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

175

219. An explosive device according to claim 205, wherein the compound has the formula M_2HX wherein M is an alkali cation, X is a singly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms.

220. An explosive device according to claim 219, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

221. An explosive device according to claim 205, wherein the compound has the formula MH_n wherein n is an integer from 1 to 5, M is an alkali cation and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

222. An explosive device according to claim 205, wherein the compound has the formula M_2H_n wherein n is an integer from 1 to 4, M is an alkaline earth cation and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

223. An explosive device according to claim 205, wherein the compound has the formula M_2XH_n wherein n is an integer from 1 to 3, M is an alkaline earth cation, X is a singly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

224. An explosive device according to claim 223, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

225. An explosive device according to claim 205, wherein the compound has the formula $M_2X_2H_n$ wherein n is 1 or 2, M is an alkaline earth cation, X is a singly negatively

charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

226. An explosive device according to claim 225, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

227. An explosive device according to claim 205, wherein the compound has the formula M_2X_3H wherein M is an alkaline earth cation, X is a singly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms.

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228. An explosive device according to claim 227, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

229. An explosive device according to claim 205, wherein the compound has the formula M_2XH_n wherein n is 1 or 2, M is an alkaline earth cation, X is a doubly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

230. An explosive device according to claim 229, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

231. An explosive device according to claim 205, wherein the compound has the formula $M_2XX'H$ wherein M is an alkaline earth cation, X is a singly negatively charged anion, X' is a doubly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms.

177

232. An explosive device according to claim 231, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

233. An explosive device according to claim 231, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

234. An explosive device according to claim 205, wherein the compound has the formula $MM'H_n$ wherein n is and integer from 1 to 3, M is an alkaline earth cation, M' is an alkali metal cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

235. An explosive device according to claim 205, wherein the compound is $MM'XH_n$ wherein n is 1 to 2, M is an alkaline earth cation, M' is an alkali metal cation, X is a singly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

236. An explosive device according to claim 235, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

237. An explosive device according to claim 205, wherein the compound is MM'XH where M is an alkaline earth cation, M' is an alkali metal cation, X is a doubly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms.

238. An explosive material according to claim 237, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

239. An explosive device according to claim 205, wherein the compound has the formula MM'XX'H where M is an alkaline earth cation, M' is an alkali metal cation, X and X' are each a singly negatively charged anion, and H is selected from the group consisting of hydrino hydride ions and hydrino atoms.

240. An explosive device according to claim 239, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

241. An explosive device according to claim 205, wherein the compound has the formula H_nS wherein n is 1 or 2, and the hydrogen content of H_n comprises at least one increased binding energy hydrogen species.

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242. An explosive device according to claim 205, wherein the compound has the formula $MSiH_n$ wherein n is an integer from 1 to 6, M is an alkali or alkaline earth cation, and the hydrogen content of H_n comprises at least one increased binding energy hydrogen species.

243. An explosive device according to claim 205, wherein the compound has the formula $MXM'H_n$ wherein n is an integer from 1 to 5;

M is an alkali or alkaline earth cation;

X is a singly negatively charged anion or a doubly negatively charged anion;

M' is selected from the group consisting of Si, Al, Ni, the transition elements, the inner transition elements, and the rare earth elements; and

the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

244. An explosive device according to claim 243, wherein said singly negatively charged

179

anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

245. An explosive device according to claim 243, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

246. An explosive device according to claim 205, wherein the compound has the formula $MAlH_n$ wherein n is an integer from 1 to 6, M is an alkali or alkaline earth cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

247. An explosive device according to claim 205, wherein the compound has the formula MH_n wherein:

n is an integer from 1 to 6;

M is selected from the group consisting of the transition elements, the inner transition elements, and the rare earth element cations and nickel; and

the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

248. An explosive device according to claim 205, wherein the compound has the formula $MNiH_n$ wherein:

n is an integer from 1 to 6;

M is selected from the group consisting of alkali cations, alkaline earth cations, silicon, and aluminum; and

the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

249. An explosive device according to claim 205, wherein the compound has the formula $MM'H_n$ wherein:

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80

n is an integer from 1 to 6;

M is selected from the group consisting of alkali cations, alkaline earth cations, silicon, and aluminum;

M' is selected from the group consisting of the transition elements, the inner transition elements, and rare earth element cations; and

the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

250. An explosive device according to claim 205, wherein the compound has the formula M_2SiH_n wherein n is an integer from 1 to 8, M is an alkali or alkaline earth cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

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251. An explosive device according to claim 205, wherein the compound has the formula Si_2H_n wherein n is an integer from 1 to 8, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

252. An explosive device according to claim 205, wherein the compound has the formula SiH_n wherein n is an integer from 1 to 8, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

253. An explosive device according to claim 205, wherein the compound has the formula TiH_n wherein n is an integer from 1 to 4, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

254. An explosive device according to claim 205, wherein the compound has the formula Al_2H_n wherein n is an integer from 1 to 4 and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

255. An explosive device according to claim 205, wherein the compound has the formula $MXAlX'H_n$ wherein n is 1 or 2, M is an alkali or alkaline earth cation, X and X' are each either a singly negatively charged anion or a doubly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

256. An explosive device according to claim 255, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

257. An explosive according to claim 255, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

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258. An explosive device according to claim 205, wherein the compound has the formula $MXSiX'H_n$ wherein n is 1 or 2, M is an alkali or alkaline earth cation, X and X' are each either a singly negatively charged anion or a doubly negatively charged anion, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

259. An explosive device according to claim 258, wherein said singly negatively charged anion is selected from the group consisting of halogen ions, hydroxide ions, hydrogen carbonate ions, and nitrate ions.

260. An explosive according to claim 258, wherein said doubly negatively charged anion is selected from the group consisting of carbonate ions and sulfate ions.

261. An explosive device according to claim 205, wherein the compound has the formula SiO_2H_n wherein n is an integer from 1 to 6 and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

182

262. An explosive device according to claim 205, wherein the compound has the formula $MSiO_2H_n$ wherein n is an integer from 1 to 6, M is an alkali or alkaline earth cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

263. An explosive device according to claim 205, wherein the compound has the formula MSi_2H_n wherein n is an integer from 1 to 6, M is an alkali or alkaline earth cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

264. An explosive device according to claim 205, wherein the compound has the formula M_2SiH_n wherein n is an integer from 1 to 8, M is an alkali or alkaline earth cation, and the hydrogen content H_n comprises at least one increased binding energy hydrogen species.

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265. An explosive device according to claim 205, wherein the compound is greater that 50 atomic percent pure.

266. An explosive device according to claim 205, wherein the compound is greater that 90 atomic percent pure.

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~~267. An explosive device according to claim 205, wherein said at least one other element comprises at least one selected from the group consisting of a proton, ordinary hydrogen atom, ordinary hydrogen ions, ordinary hydrogen molecules, ordinary hydrogen molecular ions and ordinary H_3^+ ion and said explosive material further comprises decomposing said compound.~~

~~268. An explosive device according to claim 205, wherein said at least one other element~~

183

comprises at least one element selected from the group consisting of alkaline earth metals and alkali metals and said explosive material further comprises decomposing said compound.

Sub B4

269. An explosive device according to claim 268, wherein said element comprises lithium or lithium ion.

Sub B5

270. An explosive device according to claim 205, wherein said at least one other element comprises at least one element selected from the group consisting of organic compounds and said explosive material further comprises decomposing said compound.

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271. An explosive device according to claim 205, wherein said at least one other element comprises at least one element selected from the group consisting of semiconductors and said explosive material further comprises decomposing said compound.

272. An explosive device according to claim 205, wherein said compound comprising:

(a) at least one neutral, positive or negative increased binding energy hydrogen species having a binding energy:

(i) greater than the binding energy of the corresponding ordinary hydrogen species, or

(ii) greater than the binding energy of any hydrogen species for which the corresponding ordinary hydrogen species is unstable or is not observed because the ordinary hydrogen species' binding energy is less than thermal energies at ambient conditions, or is negative; and

(b) at least one other element, wherein said increased binding energy hydrogen species is selected from the group consisting of H_n, H_n^-, and H_n^+, where

n is an integer of 1 to 8, and n is greater than 1 when H has a positive charge.

273. An explosive device according to claim 272, wherein said increased binding energy hydrogen species is selected from the group consisting of (a) a hydride ion having a binding energy greater than the binding energy of the corresponding ordinary hydride ion for p = 2 up to 23 in which the binding energy is represented by

$$Binding\ Energy = \frac{\hbar^2\sqrt{s(s+1)}}{8\mu_e a_0^2\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^2} - \frac{\pi\mu_0 e^2\hbar^2}{m_e^2 a_0^3}\left(1+\frac{2^2}{\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^3}\right)$$

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where p is an integer greater than 1, s = ½, ħ is Plank's constant bar, μ_0 is the permeability of vacuum, m_e is the mass of the electron, μ_e is the reduced electron mass, a_0 is the Bohr radius, and e is the elementary charge; (b) hydrogen atom having a binding energy greater than about 13.6 eV; (c) hydrogen molecule having a first binding energy greater than about 15.5 eV; and (d) molecular hydrogen ion having a binding energy greater than about 16.4 eV.

274. An explosive device according to claim 272, wherein the increased binding energy hydrogen species comprises a hydride ion having a binding energy of about 3.0, 6.6, 11.2, 16.7, 22.8 29.3, 36.1, 42.8, 49.4, 55.5, 61.0, 65.6, 69.2, 71.53, 72.4, 71.54, 68.8, 64.0, 56.8, 47.1, 34.6, of 19.2.

275. An explosive device according to claim 272, wherein said increased binding energy hydrogen species is a hydride ion having a binding energy greater than the binding energy of the corresponding ordinary hydride ion for p = 2 up to 23 in which the binding energy is represented by

135

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$$Binding\ Energy = \frac{\hbar^2\sqrt{s(s+1)}}{8\mu_e a_0^2\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^2} - \frac{\pi\mu_0 e^2\hbar^2}{m_e^2 a_0^3}\left(1+\frac{2^2}{\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^3}\right)$$

where p is an integer greater than 1, s = ½, ħ is Plank's constant bar, μ_0 is the permeability of vacuum, m_e is the mass of the electron, μ_e is the reduced electron mass, a_0 is the Bohr radius, and e is the elementary charge.

276. An explosive device according to claim 272, wherein said increased binding energy hydrogen species is selected from the group consisting of (a) a hydrino atom having a binding energy of about 13.6 eV/$(1/p)^2$, where p is an integer greater than 1; (b) a hydride ion having a binding energy represented by

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$$Binding\ Energy = \frac{\hbar^2\sqrt{s(s+1)}}{8\mu_e a_0^2\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^2} - \frac{\pi\mu_0 e^2\hbar^2}{m_e^2 a_0^3}\left(1+\frac{2^2}{\left[\frac{1+\sqrt{s(s+1)}}{p}\right]^3}\right)$$

+T, 1861

where p is an integer greater than 1, s = ½, ħ is Plank's constant bar, μ_0 is the permeability of vacuum, m_e is the mass of the electron, μ_e is the reduced electron mass, a_0 is the Bohr radius, and e is the elementary charge; (c) a trihydrino molecular ion, H_3^+ (1/p), having a binding energy of about 22.6/$(1/p)^2$ eV; (d) a dihydrino molecule having a binding energy of about 15.5/$(1/p)^2$ eV; and (e) a dihydrino molecular ion with a binding energy of about 16.4/$(1/p)^2$ eV.

277. An explosive device according to claim 276, wherein p is 2 to 200.

278. An explosive device according to claim 276, wherein p is 2 to 24.

136